TOBACCO SMOKING AND CESSATION AMONG TUBERCULOSIS PATIENTS IN PAKISTAN

by

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A dissertation submitted to Johns Hopkins University in conformity with the requirements for the degree of Doctorate of Public Health.

Baltimore, Maryland
2017

Abstract

Background: Cigarette smoking is a major risk factor for TB morbidity and mortality, and an important driver of TB transmission and incidence trends. There are gaps in current knowledge in Pakistan regarding cigarette smoking and TB.

Objectives: Among pulmonary tuberculosis patients in Pakistan, to:

1) Quantify the burden of cigarette smoking, and
2) Quantitatively and qualitatively characterize the attitudes, beliefs, and behaviors regarding tobacco use and cessation among TB patients and health care providers.

Methods: Study 1: A cross-sectional study of 963 male and female adults, newly diagnosed with pulmonary TB at Directly Observed Therapy Short Course (DOTS) TB treatment clinics in Karachi, Pakistan. Study 2: Using a self-administered questionnaire, we characterized the attitudes and behaviors towards tobacco use and cessation treatment of 313 TB health care professionals from TB clinics where DOTS treatment is provided. Study 3: We qualitatively evaluated the beliefs and perspectives of TB patients, clinic care providers and key stakeholders of TB and tobacco control programs, towards tobacco use and cessation treatments, with focus group discussion and in-depth interviews.

Results:

Study 1: We found among the 963 pulmonary TB patients included in the study, 14.2% (95% CI: 12, 16) were smokers within three months of TB diagnosis, and 15.6% (95% CI: 16 - 21) were former smokers who quit greater than three months prior to TB diagnosis. Male TB patients were more likely to be smokers; almost a quarter of male patients (22.7%) were smoking within three months of TB diagnosis. Study 2: Among 313 health care professionals who completed our survey, all viewed smoking as being harmful to patient health, and the majority of physicians (82%) strongly agreed it was their responsibility

to assess patient smoking. Less than half (42%) were knowledgeable about the risk of smoking on TB, and only a third of physicians believed TB patients were interested in quitting (28%) or would be successful in quitting smoking (33%).

Study 3: Barriers for treating tobacco use in TB patients were: 1) a normalized smoking environment, 2) health providers' limited knowledge of the effect of smoking on TB disease and treatment, and 3) lack of organizational support for providing smoking cessation treatment. Facilitating factors for cessation interventions were 1) patient interest in assistance to stop smoking, and 2) provider knowledge of cessation methods, and belief in the importance of smoking cessation treatment in TB programs.

Conclusion: Tobacco use is a common risk factor for TB disease in Pakistan. There is a high prevalence of cigarette smoking among male TB patients. TB patients who are smokers are likely to stop smoking when they become ill with TB. Research is needed in Pakistan to identify effective smoking cessation interventions for this high risk patient population.

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ACKNOWLEGEMENTS

I would like to sincerely thank my advisor Dr. Jonathan Golub. It has been my good fortune to be his advisee, and I am most grateful for his guidance and support throughout this degree process. A true student of Dr. George Comstock, Jonathan's kindness and generosity are matched only by his knowledge and expertise. In giving me freedom to design my research, develop study materials, and find solutions to the problems that invariably are a part of conducting research, Jonathan gave me the freedom to truly learn each step of the research process. His support and encouragement have enabled me to pursue my dissertation research with enthusiasm and focused attention.

I also wish to thank the other members of my thesis advisory committee, Dr. Carlos Castillo- Salgado and Dr. Gayane Yenokyan, for their unfailing support. It has been my good fortune to have known them both for a number of years. Dr. Castillo has always generously shared his knowledge of public health research with me, and strengthened my understanding of the ultimate goals for research. Dr. Yenokyan has helped me to know what to do with data , even when she was a doctoral student in Epidemiology herself. My knowledge of epidemiology and biostatistics is stronger because of her taking the time to work with me, and her clear, gentle explanations.

I thank Dr. Amita Gupta for being on my exam committee and for her thoughtful comments on my dissertation and research goals. It was an honor to have Dr. Nelson on my exam committee, as well as Dr. Taha and Dr. Ruff as alternatives, and to have them review my work.

This research was made possible by Dr. Aamir Javaid Khan and Saira Khowja, Executive Director and Co- Director, of Interactive Research and Development (IRD). I am most appreciative of the opportunity they created, and the chance to work with them, for making the studies happen. I especially wish to thank Dr. Salman Khan and Dr. Fahad Qazi of IRD, for their time and efforts in conducting the studies. I learned so much about the actual conduct of research, and Karachi, while working with them.

I am most grateful to the TB patients at the Indus Hospital Ghauri TB Clinic, the OHJA Malir Chest Clinic, the Sindh Government Hospital TB Clinic, and the Institute of Chest Diseases, Kotri. Thank you to Dr. Hameeda Khan, Dr. Mohammed Nawaaz, Dr. Mateen Khan, Dr. Muhammad Rafi Siddiqui, the directors of these clinics, for their support and encouragement of our research.

I gratefully acknowledge the support provided by the Pakistan National TB Control Programme, and by Dr. Ejaz Qadeer, Program Manager and Dr. Razia Kaneez Fatima, Coordinator Research & Surveillance

Funding for these studies was provided by the Institute for Global Tobacco Control, Johns Hopkins Bloomberg School of Public Health. I wish to thank Mr. Steve Tamlin, Ms. Lisa Hepp, and Dr. Jessica Elf for their input in designing the studies and administrative support.

Thank you to my colleagues in the Department of Epidemiology, Allyn Arnold, Julie Thorne, Sheila Small, Ebony Moore, Fran Burman and Matthew Miller. I would not have been able to complete my studies, let alone do research overseas, without their continuous support and friendship. I would also like to thank Dr. David Celentano and Dr. Jonathan Samet, for supporting my academic goals while I worked full time.

My dear friends Helen Walters, Ebet Chee, Charlotte Gerzak, along with Allyn, have endured my anxious ruminations about juggling family, work, writing the dissertation, throughout this long process. Thank you for your always kind words, good cheer, encouragement, and unconditional support.

I am indebted to Dr. Moyses Szklo and Dr. Hilda Szklo. Their constant support through all my academic and professional efforts has made it possible for me to succeed. I am fortunate to have them in my life.

My most heartfelt gratitude is for my family. I thank my father, Sirdar Asad Ali Khan, for his constant love and approval of all of my efforts. The achievements of my brother Dr. Adil Khan, and my sisters, The Honorable Amiena Khan and Asmat Khan, Esq, have been an inspiration for me. Their beautiful families are a source of great happiness.

My son Sadiq Kareem is the joy of my life. You have taken care of all of us, and so I was free to finish my degree. I am most proud of you Sadiq, you are a true, fine human being.

I dedicate this work to my mother, Dr. Misbah Khan. Her love and compassion, her intellect, and her integrity, are a shining example for me.

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CHAPTER 1

Introduction and Background

1.1. SPECIFIC AIMS

Tuberculosis (TB) and tobacco smoking are substantial public health problems in Pakistan. Ranked fifth among the world's 22 most highly TB-burdened countries, Pakistan reports more than 500, 000 new TB cases and 68,000 deaths due to TB each year.[1] Tobacco use is an increasing but often overlooked risk factor for TB morbidity and mortality in Pakistan. The 2014 Global Adult Tobacco Survey found an estimated 23·9 million (19·1%) adults in Pakistan used tobacco products.[2] In 2015, approximately 100,000 people died from tobacco related diseases in Pakistan; annually, more than 12% of male deaths and 4.5% of female deaths are caused by tobacco use.[3] It is estimated that 15% of deaths from TB could be prevented if smoking was eliminated in Pakistan.[4]

Epidemiologic evidence has established a strong relationship between smoking and active TB disease.[5] Cigarette smoking is recognized as a major risk factor for TB morbidity and mortality, and an important driver of TB transmission and incidence trends.[6-10] The World Health Organization (WHO) and the International Union of Tobacco and Lung Disease (IUTLD) recommend integration of tobacco cessation treatment into national TB treatment programs.[11]

Gaps in current knowledge exist regarding smoking and TB in Pakistan. The focus of the TB control strategy is finding and treating active TB disease cases.[65] Consequently treating tobacco use in TB patients is not considered a priority in TB control efforts, or an effective use of limited resources.[62] As in many high TB burden countries, with finite resources and numerous competing health priorities, there is scarce data on the prevalence of smoking among TB patients, and on the facilitators and barriers of providing smoking cessation interventions in patient settings such as TB treatment centers.

Essential first steps, for an evidence based approach to the management of TB patients who are smokers in Pakistan, are documenting tobacco smoking and smoking related characteristics of TB patients and identifying factors in TB treatment settings that will support the promotion of smoking cessation treatment.

The overall objective of this dissertation research was to investigate the feasibility of incorporating a simple tobacco cessation intervention into existing Directly Observed Treatment Short Course (DOTS) clinics in Pakistan.

Informed by the WHO framework on the social determinants of TB [12], we conducted a mixed methods investigation into tobacco smoking and cessation among TB patients attending DOTS treatment programs in Pakistan.

Specific aims of the research are:

1. **Quantify the burden of cigarette smoking among newly diagnosed pulmonary TB patients attending Directly Observed Therapy (DOTs) TB clinics in Karachi, Pakistan.**
   We hypothesized that a large proportion of TB patients in Pakistan are active smokers or involuntarily exposed to other people's tobacco smoke. We conducted a cross sectional survey to determine the prevalence and magnitude of tobacco smoking and variables associated with smoking among newly diagnosed pulmonary TB patients attending DOTs TB treatment clinics in Karachi, Pakistan
2. **Qualitatively and quantitatively characterize the attitudes, beliefs, and behaviors regarding tobacco use and cessation among TB patients and health care providers.**
   We hypothesized that TB patients expect smoking cessation advice from their health care providers; and that health professionals' levels of knowledge and involvement in smoking-cessation strategies are poor. Using in-depth qualitative interviews, we evaluated the knowledge and perspectives of TB patients and TB clinic health care providers towards tobacco use and cessation. The smoking behaviors of clinicians, and beliefs about providing smoking cessation was examined through a cross sectional survey.

1.2 Global Burden of TB and Smoking

TB remains a formidable global public health threat. Despite being a preventable and curable disease, nearly 10 million people became sick with TB in 2014; 1.5 million, more than 4000 people a day, died from TB. WHO estimates that approximately one-third of the world's population is infected with TB, with a lifelong risk of developing active TB. Every year, 3 million people with active TB are not identified by their national health systems, either not diagnosed or not treated. In addition, 3 percent of new TB cases and 20 percent of patients previously treated for TB are diagnosed with multi-drug resistant tuberculosis (MDR-TB), a form of TB that develops due mainly to incomplete or insufficient treatment. [1]

While no country in the world is free of TB, low and lower middle income countries (LMIC), with an annual gross national income (GNI) per capita less than US $4035, account for more than 90% of TB cases and deaths.[13] In 2014, 83% of reported TB cases occurred in 22 countries. The six countries that had the largest number of incident cases were India, Indonesia, Nigeria, Pakistan, People's Republic of China and South Africa.[1]

People who are infected with TB or die of the disease every year are from the most disadvantaged groups in both low resources countries and in wealthier nations.[14,15] The disease burden of TB is spread across all age groups, but those most severely affected are young people between the ages of fifteen and forty-five, the most economically productive years. [16,17] By reducing patients' physical strength and ability to work, and through the costs of seeking treatment, TB disease ultimately leads to loss of income and worsens the living conditions of those stricken with TB and their families.[18] Even those who are cured from the disease can be left with lifetime sequelae that adversely impact the quality of their life.[19-21]

1.3 TB natural history and pathogenesis

An airborne, infectious disease caused by Mycobacterium tuberculosis, TB is spread by aerosol droplets expelled by people with active disease. TB affects mainly the lungs, but can also affect other parts of the

body (extra pulmonary TB). Symptoms of pulmonary TB include fever, fatigue, weight loss and a persistent cough.[22]

Host immune response to infection with TB is on a continuum, ranging from sterilizing immunity, to subclinical disease, to severe, active disease.[23] Approximately 5% of persons who are infected with M. tuberculosis will develop disease in the first two years after infection, and another 5% will develop disease during their lifetime.[24] For 90% of infected individuals the infection is contained but not eliminated by the host immune response, and persists in an asymptomatic, sub-clinical or latent form. Individuals with latent infection, estimated to be 2 billion people, are the largest reservoir for potential transmission. Approximately 12% of these will develop symptomatic and infectious disease.[25] Each person with active TB can infect between 10 to 15 people each year.[26]

Among untreated or poorly treated cases, TB is a lethal disease with a high case fatality rate (CFR). Approximately 70% of people with untreated smear positive TB die within 10 years, the majority within the first two years. With adequate treatment, the CFR for TB falls to 2-3%.[27]

The currently recommended treatment for new cases of drug-susceptible TB is a six-month regimen of four first-line drugs: isoniazid, rifampicin, ethambutol and pyrazinamide. New tuberculosis cases (patients diagnosed with TB, who have never had treatment or had previously received TB drugs for less than 30 days irrespective of HIV status) are treated with a 6-month regimen of isoniazid, rifampicin, pyrazinamide, and ethambutol for the first 2 months (intensive phase), followed by isoniazid and rifampicin for the remaining 4 months (continuation phase). The treatment success rates for new cases of TB is 86%.[28]

Treatment for multidrug-resistant TB (MDR-TB), defined as resistance to isoniazid and rifampicin (the two most powerful TB drugs) lasts 20 months, and requires more expensive and more toxic drugs. Treatment success rates for MDR patients are much lower.[29]

The main TB control strategy supported by WHO is Directly Observed Treatment short course (DOTS), which emphasizes standardized case management of TB. The goal is to reduce transmission of M tuberculosis by rapid detection and cure of infectious TB patients living in the community, with improvements in health systems, diagnostic tools, drugs, and treatment regimens. The DOT strategy was introduced in the mid -1990s, and relies on Government commitment, diagnosis through microscopy, standardized and supervised treatment, uninterrupted drug supply, and regular monitoring assessment of treatment results for each patient and of the TB control program overall.[30]

The international TB strategy has progressed from efforts to control the TB epidemic to a goal of eliminating TB by 2030.[31.] However, despite important progress, control of TB in poor, high TB burden countries is far from being achieved. Improved living standards, economic prosperity, better health systems and care, social and economic development led to a decreased TB burden during the 20th century.[32,33] To achieve comparable results in high TB burden countries today, TB control efforts must include preventative actions that address the social drivers of the TB epidemic – those factors in the 'daily living conditions'[10] of vulnerable people which increase their chance of exposure to infectious droplets as well as impair immunological defenses to TB infection and disease.

1.3.1 TB risk factors

TB is primarily a disease of poverty.[15,34] Over 95% of prevalent cases and deaths from TB occur in LMIC.[1] And within countries, poverty is associated with increased risk if TB infection.[67] TB is multifactorial disease, poverty driven environmental factors such as malnutrition, overcrowding, and inadequate health service delivery interact with host-related factors to increase exposure and/or susceptibility to the main etiologic agent, Mycobacterium tuberculosis.[35,36,38] Factors that influence transmission and risk of infection are primarily external to the individual, with prevalence of active pulmonary TB in the community, infectiousness of the source case, and proximity of contact between infectious and susceptible individuals determining whether exposure leads to infection.[37, 38]

Host related factors that alter the immune response to TB contribute to progression to active TB disease. HIV infection is the strongest known risk factor today for progression to active TB disease, increasing the risk of developing TB to 7% to 10% per year.[34, 39,40] Other factors that contribute to increased risk of developing active TB disease include extremes of age, prior history of TB, co-morbid conditions such as diabetes and respiratory illnesses, and behavioral risk factors such as alcohol, illicit drug use, and smoking.[41]

An increasingly prevalent risk factor, tobacco smoking has emerged as an important social driver of the TB epidemic.9,[10,42] In the three countries, China, India and Indonesia, that account for over 40% of all cases of active TB each year, smoking prevalence among men is 45%, 23%, and 57%, respectively.[46]

1.4 Cigarette Smoking

Tobacco use is the largest single preventable cause of premature death and illness worldwide.[43] More than a billion people, 31% of all men and 8% of women in the world, use tobacco.[44] As smoking prevalence declines in the US and western countries, more than 80% of smokers live in low-and middle-income countries (LMIC).[45, 46] WHO estimates that more than 5 million people are killed each year by tobacco related illness.[45] By the year 2030, smoking will account for approximately one-third of global deaths and approximately 80% of these deaths are likely to occur in LMIC, more than half in people between the ages of 30-69 years.[45,57]

Tobacco use is associated with poverty,[48, 49] and the burden of smoking-related disease is inequitably borne by poor people. The poor and less educated are more likely to smoke, they smoke more cigarettes and are less likely to quit than those wealthier and better educated. [50-54] In addition, the poor have the least information on the health risks of smoking, the fewest resources, and the least access to cessation services. [55-57]

Smokers are at higher risk than nonsmokers from a wide range of diseases, including cancers of the lung and multiple other sites, ischemic heart disease, and chronic obstructive pulmonary disease.[58] Smoking is also a major risk factor for respiratory tract and other systemic infections.[59, 60]

Most cigarettes are now consumed by people in countries where TB is widespread.[45, 61] It is estimated that greater than 23% of all TB cases could be prevented if smoking and exposure to secondhand smoke were eliminated.[10] Mathematical modeling of TB epidemics to estimate the impact of future smoking trends on tuberculosis control predict that, if current tobacco smoking trends continue, smoking will cause 18 million more cases of pulmonary TB and 40 million additional TB related-deaths by 2050.[63]

1.4.1 Cigarette smoking and the risk of TB

Numerous epidemiologic studies have examined the association between smoking and TB. In 2007, three independent systematic reviews and meta-analyses confirmed that tobacco smoking is an important risk factor for infection with Mycobacterium tuberculosis, progression to pulmonary disease and death due to TB.[6,7,8] Bates and colleagues, in their meta-analysis of 24 studies on the effects of smoking on TB, showed that smoking increased the relative risk (RR) of both TB infection (RR = 1.73, as measured by positive tuberculin skin test) and disease (RR = 2.3–2.7). A systematic review and meta-analysis by Lin et al, of 38 observational studies reporting measures of association between tobacco smoking, passive smoke exposure and indoor air pollution found that smokers had an increased risk of having a positive latent TB infection, of having active TB and of dying from TB. In a qualitative review and meta-analysis, Slama and colleagues summarized the evidence for the association between tobacco and several TB outcomes, including infection, active disease, and delay in diagnosis, bacteriological conversion during TB therapy, relapse, drug resistance and mortality. In 3 of the 28 studies used to estimate increased risk in the meta-analysis, they found pooled ORs of 1.8 (95%CI 1.5–2.1) for active smoking and TB infection; 2.6 (95%CI 2.1–3.4) for smoking and pulmonary TB disease, comparing current smokers to never smokers and a pooled OR of 1.3 (95%CI 1.1–1.6) for the association between smoking and TB mortality.

The authors concluded that smoking is causally associated with TB disease, independent of the effects of potential confounders.

The association between smoking and death from TB was evaluated in a large case-control study conducted in India, in a nationally representative sample, to assess the hazards of smoking among men and women. Daily smoking of tobacco was associated with increased mortality, and rate of death due to TB was 1.7 times higher among smokers as compared with nonsmokers.[64] A 14-year prospective cohort study of 1,294,504 Koreans aged 30–95, found smoking was associated with increased mortality from TB in men and women, with a HR = 1.58 (95% CI: 1.27, 1.97) for male current smokers compared to non-smokers.[65]

1.4.2 Biological Mechanisms of Smoking

Individual susceptibility for TB infection and progression to active disease is strongly affected by host immunological weakness.[67] Cigarette smoking damages the lungs and is associated with an array of dysregulated immune system functions which may increase risk of susceptibility to pulmonary TB.[68] Nicotine, the main immunosuppressive element of cigarette smoke, inhibits both the innate and adaptive immune responses. Altered immune responses due to nicotine include a decreased level of circulating immunoglobulins, a depression of antibody responses to certain antigens, a decrease in CD4+ lymphocyte counts, an increase in CD8+ lymphocyte counts, depressed phagocyte activity, and decreased release of proinflammatory cytokines (tumor necrosis factor (TNF-α), interleukin-1 and 6 (IL-1, IL-6) .[59,60] TNF-α, IL-1and IL-6 are important defenses against replication of intracellular organisms, and are needed to maintain TB in the latent state.[69] In the lower respiratory tract, alveolar macrophages, an important component of the initial human host response to TB, are the main phagocytes.[70] In smokers these macrophages function sub-optimally due to the reduced synthesis of these cytokines.[71] Cigarette smoke has also been shown to prevent expansion and activation of CD4 T cells in response to specific pathogens and reduce interferon gamma (IFN-γ)-producing CD4 and CD8 T-cell numbers, increasing susceptibility to respiratory tract infection.[72] Other potential mechanisms by which smoking may reduce

mycobactericidal activity include oxidative stress in the lung tissues and mechanical disruption of cilia function and other clearance mechanisms in the tracheobronchial system. [7,73]

In animal model studies, cigarette smoke exposure has been shown to increase the bacterial burden in mice infected with TB. [74,75] Shang and coworkers exposed mice to cigarette smoke for several months, then challenged them and control mice with low-dose aerosol of Mycobacterium tuberculosis. At one month after infection, smoke-exposed mice developed significantly greater mycobacterial loads in the lungs and the spleen and significantly larger lung lesions than did the control mice. [74]

1.4.3 Smoking and TB treatment outcomes

Effective treatment of TB requires adherence to a minimum of 6 months treatment with multiple drugs. With appropriate treatment, bacillary load decreases rapidly, which is correlated with reduced infectivity and is the accepted measure of treatment success.[76] TB patients require retreatment if they fail treatment (remain smear positive at month 5 or later of treatment), interrupt initial treatment for 2 consecutive months (default) or if they relapse following initial treatment. [77]

Smoking among TB patients has been found to be significantly associated with poor TB treatment outcomes such as treatment default, failure and relapse after treatment, as well as worse clinical outcomes of positive sputum smear readings and delayed smear conversion. Retreatment outcomes are often poor, especially in patients with treatment failure or default.[78]

Data from a cohort analysis of TB patients in Malaysia found that, after adjustment for confounders (age, sex, alcohol use, IVDU and history of chronic diseases), ever-smoking TB patients were significantly less likely to be cured (adjusted OR 0.312, CI 0.17–0.57) and more likely to default treatment (aOR 3.249, CI 1.01–10.45) compared to never smokers.[79] Batista et al conducted a cohort study in Brazil to examine risk factors for relapse of TB after cure or completion of treatment. They found smoking was independently associated with a 2.5 fold increased risk of relapse.[80] Studies conducted in Morocco and

Canada have found smoking to be significantly associated with treatment failure, with OR 2.25, 95%CI 1.06 – 4.76 and 2.53, 95% CI 1.23–5.21, respectively.[81,82]

A key issue in TB control efforts is delay in diagnosis and commencement of treatment. Delays from onset of disease to diagnosis are a major factor in high incidence rates in many countries. Without treatment, active cases of TB become significantly more infectious and continue to infect susceptible contacts. [83-85]

Smoking is found to be a significant determinant of delays in TB diagnosis or start of treatment. TB patients in George were found to have a delay of more than 23 days in active TB diagnosis in smokers compared to never smokers (adjusted Odds Ratio, aOR: 3.03; 95% CI: 1.24–7.40).[86] Newly diagnosed pulmonary TB patients in Nepal who were current smokers were found to take longer than non-smokers in accessing TB treatment (aOR 2.03, 95%CI 1.24–3.31).[87] TB symptoms of cough appearing in smokers is often attributed to smoking, which results in delays seeking treatment for TB.[88]

Several studies have examined the impact of smoking on sputum acid-fast bacilli (AFB) smears. New TB cases are predominantly from exposure to sputum smear-positive cases. [89] Most national TB programs in high burden countries use direct microscopy of sputum for acid fast bacilli (AFB) as the standard diagnostic procedure, and grading of sputum positivity is routinely carried out.[90] Pre-treatment sputum AFB smear grade has been shown to be correlated with infectivity, disease severity and delayed sputum smear conversion.[91-95] Failure of smear and/or culture conversion in the second month of TB treatment is a predictor of treatment failure and relapse. [96,97]

A study examining smoking among sputum smear positive pulmonary TB patients in Osaka City, Japan found that smoking status was significantly correlated with higher (+2,+3) sputum smear grades.[98] Metenat et al, in a study in Iran examined the association between smoking and sputum smear conversion time among new smear-positive pulmonary TB patients. They observed that 53% of patients who were smokers had a positive sputum smear at the end of the second month of treatment, compared to 10% of

non-smokers.[99] In Brazil, in a nested case-control study of adults with non-cavitary, culture-confirmed pulmonary TB, Maciel and colleagues found that smokers had a 3-fold increased risk of remaining culture positive after 2 months of antibiotic treatment.[100] A cross-sectional, retrospective study in Ireland, a low TB prevalence country, examined 53 microbiologically confirmed cases of pulmonary TB. The infectivity status of patients on treatment was four times more likely to be prolonged beyond 6-8 weeks if the cases had a smoking history, AOR: 4.42; 95% CI: 1.23. [101]

A recent longitudinal study in Hong Kong found that TB patients who smoke have more severe clinical and radiological presentation, are infectious longer and have less successful treatment outcomes. [102]

1. 5 Study setting

Pakistan represents one aspect of the epidemiologic picture of global TB and tobacco use in developing countries. A high TB burden country in terms of absolute numbers of cases, in 2015 Pakistan had an estimated annual tuberculosis incidence rate of 270 per 100,000, of which 65% were diagnosed and treated.[1] According to the National TB Control Program (NTP), the prevalence of all types of TB in Pakistan is 630,000 cases, a rate of 348 per 100,000.[103] Pakistan is also one of 10 countries with the highest prevalence of multidrug-resistant TB (MDR-TB) globally, with 4.2 percent of new TB cases MDR and 16% of previously treated TB cases. [1] Despite progress in TB control efforts, it remains an important cause of disease burden in Pakistan, with 4.6% of all deaths in Pakistan due to TB.[104] TB is one of the top ten causes of years of life lost (YLLs) due to premature death and years lived with disability (YLDs). [105]

Pakistan is also has a heavy burden of tobacco-related ill health.[106] WHO prevalence estimates of smoking in Pakistan show that over 23 million Pakistanis over the age of 18 (approximately 19 percent of the population) currently use some form of tobacco. The Global Adult Tobacco Survey, a global standard for systematically monitoring adult tobacco use (smoking and smokeless) and tracking key tobacco control indicators was conducted in Pakistan 2014. Survey results indicate that 22 % of men, 2 % of

women are current smokers, and 11.5 % of the adult population overall are daily cigarette smokers.[107] More than 7% of adults use smokeless tobacco products, and the majority of adult men and women are exposed to second hand smoke at home and outdoors. Annually, more than 110,000 people die in Pakistan from tobacco-related illness; 15% of male deaths and 1% of female deaths are due to tobacco use. [108]

1.5.1 Geography and history

Located in the northwestern part of the South Asian subcontinent, Pakistan became a state after partition of British India in 1947. It occupies a position of geostrategic importance, bordered by Iran, Afghanistan, China, India, and the Arabian Sea on the south. A federal democracy, the country is divided into five provinces: Sindh in the south (with 23% of the total population of Pakistan), Punjab, in the east bordering India (56%), Balochistan in the west (5%) , Khyber Pakhtoon Khwa in the northwest, bordering Afghanistan (17%) and Gilgit-Baltistan (.5%) in the northeast, bordered by China.[109]

The majority of people, 64%, live in rural areas, with only one third of Pakistanis living in cities. But Pakistan is urbanizing at an annual rate of three percent, one of the highest migration rates in South Asia. The United Nations Population Division estimates that, by 2025, nearly half the country's population will live in urban areas. [112] Pakistan's rapidly growing urban population is a combination of internal rural – urban migration and overall annual demographic growth rate of 2%. The main migration destinations are the larger cites of the Punjab and Sindh. Due to political conflict, the largest movement of people has been from the norther areas, Khyber Pakhtoon Khwa, to Karachi. [113] While cities generate up to 78 percent of Pakistan's gross domestic product, unregulated urbanization has created an urban housing shortage and challenges to providing public services. In Pakistan in 2010, about one in eight urban dwellers lived below the national poverty line and an estimated 46.6 percent of the urban population lived in slums.[114, 115, 116]

1.5.2 Health Indicators

With a population of 199 million, Pakistan is a large, demographically young country, where 32% of the population is under age 15, and 63% of the country's residents are age 15-64. Life expectancy at birth is 66 years.[110, 111]

Pakistan is classified as a lower middle income country by the World Bank, with GNI per capita of USD 1,440 in 2015.[117] According to the World Bank Human Development Report of 2015, Pakistan has made significant progress in reducing poverty, from 64.3% in 2002 to 29.5% in 2014.[118] The percent of Pakistan's population below the poverty line of two dollars a day (or an income of Pakistan rupees 200 per day) was 6%. The proportion of the population which lives below $ 3.10 per day is close to 39%.[117]

Pakistan falls below many other countries in the region in education, nutrition, and health development indicators. Access to education remains low and the completion rate for primary education is among the lowest in the world. It is estimated that 45% of Pakistan's adult population is illiterate. [120] Public spending on health was .42% of the GDP in 2014, a total health expenditure per person roughly of $3 dollars, highlighting the limited public resources for health care in Pakistan. [119, 121]

The Multidimensional Poverty Index (MPI) of the United Nations Development Program, is a global measure of acute poverty for developing countries. It complements traditional income-based poverty measures by capturing the severe deprivations at the household and individual level with respect to education, health and living standards. Pakistan's MPI is 0.197, indicating that poor people in Pakistan experience 19.7% of the deprivations that would be experienced if all people were deprived in all indicators. The percentage of the population that lives near multidimensional poverty is 15%, and 27% live in severe multidimensional poverty. [118]

Pakistan has a double disease burden. About 40% of the disease burden is in the form of communicable diseases including TB, measles, acute respiratory infections, diarrhea, malaria, gastrointestinal infections and viral hepatitis. Pakistan is of the three remaining countries in the world with endemic poliomyelitis.[122] The estimated HIV burden in Pakistan is low, with prevalence of less 1% among adults aged 15 to 49. Among injection drug users, HIV prevalence increasing, and is currently estimated at 20%.[123] Non-communicable diseases and injuries account for 59% of the total disease burden, with cardiovascular disease representing the largest portion followed by cancer and chronic respiratory diseases. Leading risk factors for deaths from non-communicable diseases are tobacco use and high blood pressure.[124,125].

1.5.3 Pakistan Health care system

The healthcare delivery system in Pakistan is divided between low cost government funded facilities offering basic services and private sector medical institutions and providers. The public sector is made up of 1142 public sector hospitals, 5527 basic health units (BHUs), 650 rural health centers (RHCs) and 5499 dispensaries. BHUs serve approximately 10,000 people, RHUs serve populations of up to 100,000, and provides both inpatient and outpatient services. Secondary and tertiary referral centers full scale service or teaching hospitals, serve more than 1 to 2 million people. These facilities together with 175,223 doctors brings the current ratio of one doctor for 1073 people and one hospital bed for every 1647 persons. [119, 126] This established system of primary, secondary and tertiary level health care facilities is further supported by more than 1,00,000 lady health workers and other community health workers.[133]

The private sector in Pakistan is large and diverse, mostly unregulated, with huge variations in the type and quality of care provided. It includes not-for-profit NGOs and for-profit private practitioners, both formal and informal. It also includes a network of registered private facilities that are involved in providing healthcare services; most of these are clinics, chemist shops (69%) and medical stores (27%).[125-127] With a poorly funded and supported public sector health care system, 80% of the population uses the private-sector, fee-for-service system.[126,128, 129]

1.5.4 Tuberculosis Control in Pakistan

The National TB Control Program (NTP), under the Ministry of Health, is responsible for developing national guidelines, framing policies and generating resources for implementation of TB control measures at the provincial and district level. Actual care deliver , including program planning, training of care providers, case detection, case management, monitoring and supervision are the responsibility of the Provincial TB Program (PTP). The Government of Pakistan endorsed the DOTS strategy in 1995, but progress in TB control efforts was only made when a National Tuberculosis Program was reestablished in 2001. DOTS was expanded to all public health facilities as part of primary health care and universal coverage of all public facilities was reached in 2005. The NTP has recently began implementing public-private models of care to improve case detection rates.[130, 131]

The majority of TB cases in Pakistan first seek TB care and treatment from a private health care provider, or from hospital based physicians.[132] Significant predictors for delayed diagnosis and treatment initiation are: belief that low-cost services are inadequate, being diagnosed in health facilities not belonging to the NTP; visiting several health care providers before diagnosis and poor satisfaction with care.[134-136]

Studies that examined community providers' knowledge and awareness of the diagnosis and treatment of TB have found that care quality is poor. There is low awareness of the provisions of TB treatment guidelines and NTP-recommended treatment regimens, under-use of sputum smear microscopy for diagnosis, use of non-recommended drug regimens with incorrect combinations of drugs; mistakes in both drug dose and duration of treatment; and failure to supervise and assure adherence to treatment. [137-139]

TB diagnostic centers in Pakistan are government run, and are open 7 days a week, most from 9am-2pm, with longer times for sputum collection. After TB suspects register, TB screening is done by doctors, and sputum submission instructions are given by laboratory technicians. Once diagnosed, patients are again seen by the physician and counseled on how to take the medicine. Patients pick up medications from the pharmacist and treatment facilitators and supporters monitor treatment adherence.

The clinics are accessible to populations from across the city, and serve individuals from low to middle socioeconomic groups residing in highly populated locations. The clinic patients are either self-referred or referred by their general practitioners. [148]

Important challenges for TB control in Pakistan are a lack of community involvement, limited engagement of the private sector, increasing number of multiple drug-resistant (MDR) cases and a recent rise in HIV cases among injection drug users who are also at much higher risk of TB. [140]

1.5.5 Tobacco Use and Control in Pakistan

Pakistan is one of the top 10 tobacco producing countries in the world, and has well established cigarette manufacturers.[141] The two major transnational tobacco companies in Pakistan are British American Tobacco (in Pakistan since 1947) and Phillip Morris. The price of cigarettes in Pakistan is among the lowest in the world. The average amount for a pack of cigarettes is 40 Pakistan rupees (US 40 cents) but lower tier cigarettes are sold for Rupees 17 per pack. Even less expensive are the more than 19.5 billion illicit cigarettes sold in Pakistan. Tobacco products are sold through informal distribution means, with small vendors responsible for most sales. In 2013-14, the cigarette industry contributed about Rs80 billion (US$762million), to the national revenue, as one of the highly-taxed industries. [142, 143]

Predictors of tobacco use include older age, male gender, low socioeconomic status, alcohol use, and rural geographic location.[144, 145]

Regulations against smoking have been in place in Pakistan since the late 1970's. An ordinance on printing health warnings on cigarette packets was first passed in 1980. In 2003, a national law was passed prohibiting smoking in indoor public places and protecting the health of non-smokers. This ordinance governs multiple areas of tobacco control, including sales to minors, tobacco advertising, promotion and sponsorship. Enforcement however, remains weak and compliance is low. Pakistan ratified the Framework Convention on Tobacco Control (FCTC) in 2004, yet tobacco control policies are poorly

implemented and enforced. Pakistan has a national agency for tobacco control and tobacco prevention is a national objective, but the agency has limited staff and resources. [146]

1.5.5 Study Location

Our study took place in Karachi, Pakistan. One of the world's largest cities, approximately 23 million people live in Karachi, at a density of nearly 16,000 individuals per square mile.[147] Karachi, is characterized by having very affluent to low-income marginal neighborhoods with little access to the health care system. Residents of low-income neighborhoods also suffer from overcrowding and malnutrition. Karachi faces the challenges central to many developing metropoles - rapid urbanization, overcrowding, and poverty and attendant environmental conditions that favor the incubation of disease. Estimates of smoking prevalence in Karachi, among the general population, range from 7-39%.[148],[149]

There are more than 60 DOTS treatment centers located at government clinics and hospitals throughout Karachi. Most of the clinics are located in older, lower-income sections of the city. TB diagnosis and treatment are provided free of charge at these clinics. Usually, clinics treat approximately 3-400 cases of TB per month. Criteria for selection of study sites was patient volume, number of TB cases registered per quarter, and administrative support for the study.[150]

The study primary site was the Indus Hospital, a 150-bed private tertiary care health facility providing care free-of-cost. It is located in an area to the east of Karachi port, and is surrounded by one of Pakistan's largest industrial zones. Indus Hospital's direct catchment population is a multi-ethnic community of approximately 2.5 million comprised of internal migrant settlements adjacent to historical fishing villages along the south-eastern Karachi coast. The Indus hospital's TB clinic sees 350 patients a day. The other study sites were Indus Hospital affiliated institutions: Sindh Government Hospital TB Clinic, New Karachi; OJHA Institute of Chest Diseases, Malir Chest Clinic and the Institute of Chest Diseases, Kotri.

1.6 Conceptual framework

Our research was informed by the causal pathways framework of the WHO Commission on the Social Determinants of Health (Figure 1).[151] Pre and post the DOTS era, TB incidence has been aligned with social and economic conditions which improve human development - healthy life, education, equitable standard of living, clean water, sanitation, security. [152] The social determinants model of TB identifies how conditions of socioeconomic inequality, population mobility, and rapid urbanization and population growth determine the distribution of key risk factors for TB, which influence every stage of the TB disease spectrum: exposure, infection, active disease, and mortality.[12]

People who live in poverty are more likely to come in contact with people who have TB disease. They are also more likely to smoke, starting at a young age, and less likely to quit smoking. Cigarette smokers, in high prevalence TB communities, are at increased risk of exposure to and infection from TB, and of developing more severe, active TB disease. The consequences of smoking on their TB disease progression and treatment outcomes may be ameliorated through effective smoking cessation interventions.

The overall objective of this dissertation research was to better understand how many TB patients in Pakistan smoke, their smoking behaviors and characteristics, as well as the response of the TB health providers to patient smoking, to assess the feasibility of incorporating a simple tobacco cessation intervention into existing Directly Observed Treatment Short Course (DOTS) clinics in Pakistan.

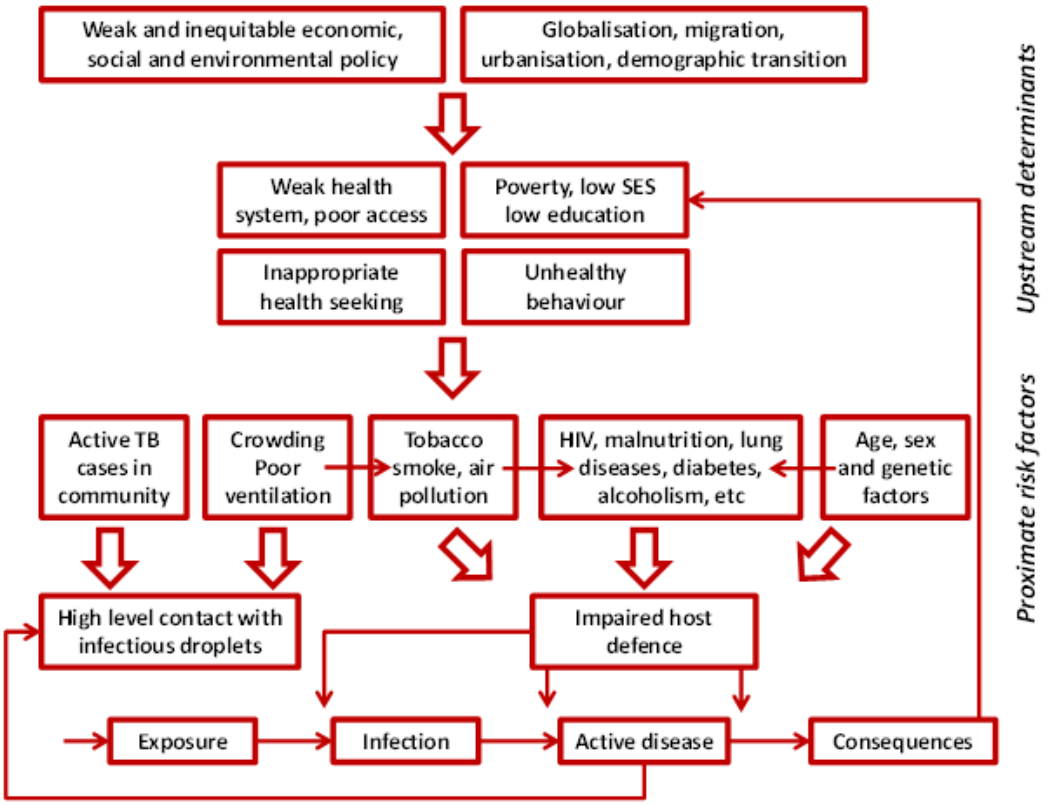

Figure 1.1: WHO Framework for proximate risk factors and upstream determinants of TB[10]

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CHAPTER 2

Prevalence of and Risk Factors for Cigarette Smoking
Among Pulmonary TB Patients in Karachi, Pakistan

2.1 Abstract

Objective: To assess the prevalence of and risk factors for cigarette smoking among tuberculosis (TB) patients in Karachi, Pakistan.

Methods: For this cross-sectional survey, conducted from November 2010 to March 2011, newly diagnosed adult pulmonary TB patients were recruited at four, Directly Observed Therapy short course (DOTs) government diagnostic clinics in Karachi, Pakistan. Patients were interviewed using a structured interviewer administered questionnaire. Descriptive statistics were used to summarize socio-demographic, clinical, sputum mycobacteriology and TB risk factors (HIV, alcohol use) and smoking behavior. Multivariate logistic regression was used to identify factors independently associated with tobacco smoking.

Results:

Of the 963 pulmonary TB patients included in the study, 14.2% (95% CI: 12, 16) were smokers within three months of TB diagnosis, and 15.6% (95% CI: 16 - 21) were former smokers who quit greater than three months prior to TB diagnosis. Among 551 (57%) male patients, 22.7% (95%CI: 19 - 26) were current smokers, while only 2.9% (95% CI: 1.2, 4.5) of female patients reported current smoking. Using logistic regression, recent smoking was found to be associated with male sex (adjusted Odds Ratio 7.3, 95%CI: 4.0, 14); increasing age (AOR 1.02, 95% CI: 1.01,1.04), and alcohol use (AOR 3.9, 95% CI: 2.0, 8.0).

Conclusions: Approximately a quarter of male TB patients attending government TB treatment clinics in Karachi, Pakistan report smoking within three months of their TB diagnosis. Tobacco use surveillance among TB patient populations is critical in national TB control efforts. Assessment of patients smoking status should include smoking behavior at onset of TB symptoms.

2.2 Introduction

Tuberculosis (TB) is a leading cause of premature mortality and disability in Pakistan, and an important public health threat.[1] Ranked fifth among the 22 high TB burden countries, Pakistan had an estimate half a million new cases of TB in 2015, and 44,000 people who died due to TB. Of the 510, 000 estimated new TB cases, only 331,809 were notified, and 200,000 people were not diagnosed or treated. The incidence and prevalence rates of TB in Pakistan in 2015, inclusive of HIV, were 270/100,000 population and 341/100,000 respectively, with a mortality rate of 56/100,000 population.[59]

Tobacco use is increasing in Pakistan [5] with more than 20 million Pakistani adults, and approximately one quarter of all adult men, currently smoking tobacco.[6] Understanding the relationship between TB and smoking in Pakistan is critical in national health planning as the convergence of these epidemics poses a significant challenge to national TB control efforts.

Epidemiologic evidence has consistently shown cigarette smoking is an independent risk factor for TB, doubling the risk of infection and progression to active pulmonary disease, as well as reduced survival.[9-11] TB patients who are smokers take longer to access health care services[12], have an increased risk of more severe disease [13], longer duration of sputum positivity[14], poor treatment outcomes[15], and are at increased risk of developing TB again.[16,17]. Smokers with TB have been also shown to have a higher rate of treatment non-adherence and loss to follow-up.[18] TB patients who smoke therefore are not only more likely to be infected with TB but, in addition, remain contagious longer; and therefore pose a risk not only to themselves but to others in their homes and community for a longer period than nonsmokers, both before being diagnosed and even after starting TB treatment.[19]

The World Health Organization (WHO) and the International Union against Tuberculosis and Lung Disease (IUTLD) recommend integration of smoking cessation services within national TB control programs.[24,25] However, major gaps in knowledge exist regarding smoking and TB in Pakistan. The focus of the international TB control strategy is finding and treating active TB disease cases.[26] Consequently, treating tobacco use in TB patients is not considered a priority in national TB control

efforts, or an effective use of limited resources. [27] There is little data on the prevalence of tobacco smoking or on patterns of tobacco use among TB patients in Pakistan. Greater understanding of this modifiable risk factor and its role in local TB disease epidemiology will help inform effective smoking cessation interventions.

We conducted a tobacco prevalence survey to estimate the burden of cigarette smoking among newly diagnosed pulmonary TB patients attending Directly Observed Therapy (DOTs) TB clinics in Karachi, Pakistan and to Identify predictors of tobacco use among TB patients. Moreover, we assessed readiness to quit and beliefs about tobacco-related health effects among smokers.

2.3 Methods

2.3.1.Design and Setting

A cross-sectional study was conducted among newly diagnosed male and female TB patients being treated at four DOTS TB clinics between November 2010 and March 2011. Study participants were age 18 years or older and diagnosed with pulmonary TB within two months of their interview date. TB status was verified via the date of registration on the TB 01 patient treatment card of the National Tuberculosis Control Program. The TB 01 card is used to document a TB patient's date of initial registration as a TB case, treatment category, disease classification (pulmonary or extra pulmonary TB) and treatment regimen. We excluded patients with extra pulmonary or multi-drug resistant (MDR) TB.

The research was conducted in partnership with the Pakistan National Tuberculosis Control Program and a local research organization in Karachi, Pakistan. A metropolitan urban setting, Karachi has an estimated population of 17 million, which is continuously increasing, as it is a main destination for internal rural to urban migration [53]

The primary study site was the Indus Hospital, a 150-bed private tertiary care health facility providing care free of cost. It is located near the Karachi port, and is surrounded by one of Pakistan's largest industrial zones. Indus Hospital's direct catchment population is a multi-ethnic community of

approximately 2.5 million comprised of internal migrant settlements next to historical fishing villages along the south-eastern Karachi coast. The Indus Hospital's TB clinic sees approximately 350 patients a day. Additional study sites were Indus Hospital affiliated institutions: Sindh Government Hospital TB Clinic, New Karachi; OJHA Institute of Chest Diseases, Malir Chest Clinic and the Institute of Chest Diseases, Kotri. Criteria for selection of study sites was patient volume, number of TB cases registered per quarter, and administrative support for the study.

Study participants were selected based on non-probability consecutive sampling between November 2011 and March 2012. We approached all newly diagnosed pulmonary TB patients attending the DOTS clinics; those who meet the inclusion criteria were asked to participate in the study. The study consent form was read to potential participants, who provided written informed consent of study enrollment with either a signature or a thumbprint. We estimated a sample size of 800 clinic patients (400 women and 400 men) would provide estimated prevalence ranges of 5-10% for women and 15-45% for men, with precision to within 5%.

2.3.2. Survey instrument

Tobacco exposure was measured by an interviewer administered questionnaire based on the Centers for Disease Control and Prevention's Global Adult Tobacco Survey (GATS). [6] GATS is designed to assess quantity and frequency of tobacco use, exposure to second hand smoke, access to tobacco, tobacco dependence and quit attempts among adults. Additional questions on alcohol consumption, HIV status, and beliefs about the health effects of smoking on TB were added to the survey.

2.3.3 Study procedures

After obtaining written consent from patients, face-to-face interviews were conducted with study participants using a structured questionnaire. In addition to demographic and socioeconomic data, self-reported information on alcohol use, HIV status and TB symptoms were recorded. Patients' treatment status (new case of TB or retreatment), and smear and culture status were abstracted from medical and laboratory records.

2.3.4 Definitions of Variables

Tobacco exposure

Based on self-reported smoking behavior, GATS classifies a participant's smoking status as current, former or never smoker. For our study, to reflect the smoking experience of patients who may stop smoking at onset of TB symptoms/diagnosis, current smokers were defined as patients who self-reported smoking at time of interview or who quit smoking within three months of TB diagnosis. We defined former smokers as patients who quit smoking more than three months before TB diagnosis, based on estimates of diagnostic and treatment delays among TB patients in Pakistan.[45] An expanded definition of current smoking included patients who were smoking within six months of their TB diagnosis

Patients were asked "Do you currently smoke tobacco on a daily basis, less than daily, or not at all?" Patients who reported not smoking currently were asked "In the past, have you ever smoked tobacco on a daily basis, less than daily, or not all?" Patients who reported not smoking currently or in the past were defined as never smokers. Current smokers were asked the last time they smoked (weeks, days, hours, minutes); level (daily/occasionally) and amount of current use of the following: machine made cigarettes, bidi (hand rolled cigarettes), cigars, hookah, and clove cigarettes. Nicotine dependence was assessed using the "time to first cigarette" item (ie, "How soon after you wake up do you smoke your first cigarette of the day?") from the Fagerström Test for Nicotine Dependence.[56] This single item is an objective measure of nicotine dependence and was used in place of the total six items of the test, to reduce survey length.

Former smokers were asked how long since they stopped smoking (years, months, weeks, days, hours) and the reasons they stopped smoking (illness, concerns about health, pressure from family/friends).

All patients were asked about secondhand smoke exposure "How often does anyone smoke inside your home? How often does anyone smoke around you in public places? Daily, weekly, monthly, never?", and about use of smokeless tobacco.

2.3.5 Risk factors assessed

Demographic and socio-economic factors assessed included sex, age, education, income and household characteristics including cooking fuel used. Age was measured as a continuous variable, in years, and also categorized into four age groups - 18-25, 26-40, 41-55, >55. Socio-economic position was measured by education, income, and household assets. Years of education were categorized as no education, one to eight years of school, and greater than eight years of school. Household wealth was measured with a household assets index (based on electricity, flush toilet, telephone, mobile phone, television, radio, refrigerator, washing machine, motorcycle, car) and monthly income. Income was categorized as earning less than 5000 Pakistani rupees (PKR), approximately 50 USD, a month, earning 5000 to 15,000 PKR a month, or earning greater than 15,000 PKR per month. Alcohol use was documented by asking patients how often they drank alcohol before their TB diagnosis, and how many drinks they had. Given the low alcohol use reported, this variable was categorized as yes/no.

Variables related to TB, which were verified from the medical records, included whether patients were diagnosed with TB for the first time (new TB cases), whether the patients had completed a previous TB treatment and acquired TB a second time or patients that defaulted from previous TB treatment and returned to treatment (retreatment TB cases); TB symptoms (cough, sputum production); and results of the initial sputum smear test and of initial culture examination, if done. HIV status was self-reported.

2.3.6 Analysis

We performed a descriptive study of the prevalence of smoking among participants and summary statistics, (frequencies and proportions) of categorical variables, and means, medians for continuous variables, were calculated.

The proportion of smokers among TB patients, (and its exact binomial confidence interval) was estimated for the entire sample as well as stratified by age, sex, and type of TB treatment (new or retreatment). Comparisons of demographic and household characteristics by smoking status, was done by using analysis of variance for continuous variables and Pearson's $\chi 2$ test or Fischer's exact test, as appropriate, for categorical variables. Statistical significance of adjusted associations was accepted at alpha $\leq .05$.

Logistic regression analysis was carried out to identify independent predictors for current smoking. All variables statistically significant in the univariate analysis were entered into a multivariate logistic regression.

Two definitions of current smoking were used: 1) The planned study definition for current smoker, patients who self-reported smoking at time of interview and those who self-reported quitting within three months of the interview; and 2) an expanded definition of current smoking which also included patients who reported quitting smoking within four to six months before the interview.

The primary analysis was conducted using the planned definition for current smoking; secondary analyses considered the expanded definition.

All data were analysed using Stata 12.0 (StataCorp LP, College Station, TX, USA).

2.3.7 Ethics

Ethics approval was obtained from the institutional review boards of Indus Hospital, Karachi, Pakistan, and the Johns Hopkins Bloomberg School of Public Heath, Baltimore, MD.

2.4 Results

We approached 1013 TB patients between Nov 2010 and March 2011, to participate in the smoking prevalence study. Of these, 47 were ineligible (29 were extra pulmonary TB patients, 7 were under the age of 18 years, 11 were multi drug resistant patients) and three patients refused to participate.

Characteristics of the 963 stratified by smoking status are presented in Table 1. The median age of the study population was 30 (Interquartile range (IQR): 22 -46) and 551 (57%) were male. Half of the patients interviewed had no formal education and 63% lived on a total monthly income of $100 or less. The majority of the patients (73%) were new cases of TB, and 27% were retreatment cases. Among patients with reported smear results, 29% were smear negative and 30% were smear grade 3+. Prevalence of HIV was less than 1% in this patient population.

Lifetime (ever) tobacco smoking prevalence was reported by one third of the patients. At the time of the interview, 49 (5%) patients in our sample self- reported current smoking, either daily or less than daily; 237 (24.6%) patients identified themselves as former smokers and 675 (70%) as never smokers. Among former smokers, 88 (37%) stated they had quit smoking within the last three months, 36 (15%) had quit 4-6 months before the study interview, and 42 (17%) of former smokers had quit more than 5 years before their current TB diagnosis.

Using the primary study definition for current smoker, the 88 former smokers who reported smoking within three months of the study interview were reclassified as current smokers. This resulted in a 14.2% overall prevalence of current smoking in our study sample (Table 1).

Among current smokers, 91% were male, had a median age of 41 years (IQR 30-50), 16% had up some formal education, completing 1-8 years of school, and 19% had a monthly income between 10,000 to 15,000 PKR. Alcohol use was 52% among current smokers compared to % among non-current smokers. Of the 256 patients who were being retreated for TB, 12% were current smokers compared to 15% among those being treated for the first time.

Former smokers were slightly older compared to current smokers and never smokers, with a median age of 45 years (IQR 30-60), and had less education, with 18% having no formal education. Former smokers were more likely to have a monthly income of 5000 PKR rupees or less (18%), and to have two or fewer household assets (24%). Former smokers made up 25% of retreatment cases of TB, 27% of patients who reported alcohol use and 13% (one case)) of self-reported HIV.

When we expanded our definition of current smoking to include patients who were smoking within six months of their TB diagnosis, the prevalence of current smoking was 18% , and 29% of male and 4% female TB patients were smokers. Tables 2a and 2b present smoking prevalence among TB patients in Karachi, Pakistan, under the planned and expanded study definitions of current smoking stratified by gender, age, and treatment status.

Table 3 presents the unadjusted and adjusted odds of predictors of current smoking, based on the study definition of smoking status. We found older age, male sex, and alcohol use were statistically significantly associated with smoking behavior among TB patients in multiple logistic regression analysis. The odds of being a smoker increased by 2% for each increasing year of age (adjusted Odds Ratio 1.02, 95%CI: 1.01, 1.04), and patients aged 41-55 years had 3.5 the odds of being a current smoker compared to patients age 18-25. Male TB patients had a seven fold increased odds of smoking (AOR 7.3, 95%CI: 4.1-14), compared to females. Current smoking was also more common among patients who reported using alcohol (AOR 3.9, 95%CI:2.0, 7.7).

Because smoking was reported primarily among men, we looked separately at factors associated with smoking among males (Tables 4 & 5). Self-reported smoking among females was too low to conduct a separate analysis. Almost a quarter (22.7%) of male patients were current smokers. Male current smokers had more education and a higher monthly income. The median age for male smokers was 41 (IQR 30-50), 33% had between 1-8 years of education, and 31% reported a monthly income of 10,000-15,000 PKR. Sixteen percent of male current smokers had a prior episode of TB, and 53% of alcohol use was reported by male current smokers. Of the 5 patients who reported being HIV+, 2 (33%) were current smokers. We found older age and higher monthly income were significantly associated with smoking behavior among male patients. Among male patients who had been treated for TB previously, the odds of being a smoker were 44% lower compared to male patients who were new cases of TB, controlling for all other factors.

We conducted a sensitivity analysis to explore the consequences of excluding patients who had quit smoking four to six months prior to the study interview, based on our study definition of current smoking. Characteristics of the 36 patients who quit smoking four to six months were compared with those who stopped smoking within three months. Among these self- reported former smokers, 32 were males and four were females, 22 were between the ages of 26-55, and twelve (nine males, three females) had a prior diagnosis of TB. Primary analyses were rerun, treating all patients who had quit 4-6 months prior to the study interview as current smokers. The inclusion of the 36 patients did not affect substantially our results, as only minor changes of the ORs were observed. The OR for male gender as a predictor for smoking was 7.8 (95% CI 4.5 - 13) when the 36 patients were treated as current smokers and 7.3 (95% CI 4.0 - 14) under the planned study definition of current smoker. Table 6 and 7 present characteristics of the 36 patients and unadjusted and adjusted odds ratios for predictors of smoking under the expanded definition of current smoking.

Our survey was developed to capture smoking characteristics of patients who reported smoking at the time of the study interview. Tables 8 and 9 present characteristics of the 49 patients who self-reported being a current smoker at the time of the study interview. The majority of patients who were smoking within two months of their TB diagnosis were male (41 patients, 84%) with a mean age of 43 years. Half (24 patients, 49%) had no formal education, and 28 of the 49 patients (57%) earned less than 10,000 Pakistan rupees per month.

All of the 49 self-reported current smokers smoked machine made cigarettes. The median (interquartile range) number of cigarettes smoked per day was 6.5 (1-35 cigarettes), with 14 Pakistan rupees the average amount paid for cigarettes. Half of current smokers had their first cigarette greater than 30 minutes after waking.

Current smokers were asked about their quit attempts, and when they thought they would quit smoking. Among the TB patients who self-reported smoking at the time of their TB diagnosis, 45% were planning to quit smoking within the month. Two thirds of current smokers had tried to quit, most because they felt

sick (60%) or to improve their health. Among former smokers 48% had quit because of illness. Participants were asked about the effects of smoking. In terms of knowledge about the harmful effects of TB, almost all current smokers (93.8%) believed that quitting smoking would prevent them from getting TB again. Among former smokers who identified themselves as former smokers, 46% (107) quit because they "felt sick" and another 40% (87) did so to "improve their health". While some former smokers quit with a physician's help, most "didn't see a doctor before quitting.

2.5 Discussion

In this cross sectional study, we found that 14.2% (137) of 963 male and female patients newly diagnosed with pulmonary tuberculosis in Karachi, Pakistan were daily or occasional smokers within three months of their TB diagnosis; 16 % (151) had stopped smoking greater than three months before beginning TB treatment, and 70% of patients had never smoked. Ninety-one percent of all smokers' were male, and 23% of all male TB patients and 3% of the female patients were current smokers. When we expanded our definition of current smoking to include patients who were smoking within six months of their TB diagnosis, 18% of TB patients were current smokers, 29% of male patients and 4% of females.

The epidemiology of TB varies in different parts of the world, influenced by the prevalence of various risk factors for TB infection and disease. Cigarette smoking is recognized as an important driver of TB disease burden. [28] Studies that have evaluated the prevalence of smoking among TB patients in different settings have reported varying results. [29] Observational studies that have examined smoking among TB patients in low-middle income countries have found high rates of tobacco use among TB patients, with prevalence ranging from 18% to 71%. [22,30, 31, 32, 33]

Smoking prevalence among TB patients in high TB burden, high tobacco use countries has been shown to be higher than in the general population. A case-control study in China reported a prevalence of cigarette smoking of 54.6% among TB cases 20; in South Africa, a cross-sectional analysis of 500 patients with suspected TB found that 56% of those with active TB were current smokers 21; in India, 71.2% of TB

patients were current smokers 22; and in the USA, a low incidence setting, a study in Texas found that cigarette smoking was reported by one third of the TB patients with diabetes.23 The prevalence of tobacco smoking among TB patients in Pakistan we report is lower than findings reported from other countries., but is similar to estimates of smoking prevalence among the general population in Pakistan. In 2014, the Pakistan Bureau of Statistics under the coordination of the Ministry of Health and WHO conducted the Global Adult Tobacco Survey (GATS) in Pakistan. GATS found overall 12.4% (15.6 million adults) currently smoked tobacco, 19.4% of men and 1.0% of women; [34] An earlier cross-sectional survey in Pakistan, of a nationally representative sample of men and women, found the overall prevalence of current smoking to be 15.2% among 2,644 respondents, 26.6% among males and 0.4% among females. [35] The low overall smoking prevalence we observed may also reflect that our patient population was recruited primarily from urban clinics, and higher tobacco use has been observed in rural areas in Pakistan.[49]

Information on cigarette smoking among TB patients in Pakistan is sparse. However, two recent studies found overall smoking prevalence to be 14.4% and 9% among their TB patient study samples. The prevalence of smoking among male patients was higher in both of these studies, 23.5% and 17.7%, respectively, similar to our findings.[40,41] We found smoking prevalence to be markedly higher among male TB patients than female patients, consistent with smoking patterns observed in the general population in Pakistan, and in other studies. In low and middle income countries, smoking is more common among men, as is TB.[36, 37] TB notification data show significant difference in TB prevalence between men and women, with a male-to-female ratio of 2:1.[38,39.]

The smoking prevalence reported in our study may be an underestimation of smoking behavior among TB patients in Pakistan because smoking status was self-reported. TB patients may not have disclosed their smoking behavior in a health care setting, especially when being treated for a respiratory illness.[42, 43] We may have also misclassified current smokers as former smokers, based on our study definition of current smoker. TB patients who smoke have been shown to quit smoking when they begin to have respiratory

symptoms and feel ill. [44] Our study definition of current smoker, patients who were smoking within three months of diagnosis, excluded patients who quit smoking between 4-6 months. The study definition of current smoking was based on WHO findings that the median duration of delay between onset of TB symptoms and diagnosis and treatment was 91 days for TB patients in Pakistan.[45] However, most TB patients in Pakistan first seek care from health providers other than government treatment centers (traditional healers, pharmacy's , private practitioners).[46, 47] The period between onset of symptoms, when patients may have quit smoking and TB diagnosis could have been longer than three months for some patients. (Figure 1)

The TB patients in the study who reported smoking at time of diagnosis were found to be primarily light, casual smokers, smoking 5-6 cigarettes a day. And, even though cigarettes in Pakistan are very inexpensive [55], most smokers purchased individual cigarettes rather than packs or cartons. This may be due to the young age of our study population, with 25% of patients under the age of 25. Most smokers in developing countries start smoking in their early twenties.[50] Our finding may have also been affected by poverty.[52] The TB clinics from which the study sample was recruited are located in older sections of Karachi, with large migrant communities, where poverty is widespread. In the total study sample, 63% of patients lived on 10,000 Pakistani rupees ($100) per month, 14% on less than 5000 rupees ($50). Only a few, less than 7%, earned 20,000 rupees ($200) or more a month. A third of the patients had only two of the listed household assets. Patients who were smokers in this study may have smoked fewer cigarettes, less often, because they were young smokers, just starting to smoke, and who could afford to purchase only a few cigarettes a day, rather than a pack of cigarettes.

Our study has some limitations. We were unable to have biomarker verification of smoking status, thus relied on patient self-report. Self-reported data on smoking status has been shown to underestimate smoking status. [58] There is also possible sampling bias through the inclusion of a convenience sample at TB clinics. However, we have used previously validated questions, pretesting of the questionnaires, and interviewer training and supervision, as an attempt to prevent information bias.

Our survey was developed to specifically capture smoking behavior of "current smokers". TB patients who reported they were former smokers were not asked about their smoking behavior. And, we did not collect information on other risk factors associated with both smoking and TB, such as drug use.

This study provides insight into smoking behavior among TB patients in Pakistan, and contributes to the literature on tobacco use among TB patients. We found that current smokers were mostly men, with low education and low monthly income levels, and greater alcohol use. Our results are consistent with previous research suggesting that smoking may explain a third of the gender differences in TB disease prevalence in high burden countries.[55] Despite being aware of the negative effects of smoking, a high proportion of male patients in our study were smokers.

The study results provide preliminary data for future studies investigating smoking treatment strategies for TB patients in Pakistan, and have important implications for research and practice. Smoking is a highly prevalent risk factor, and its role in disease development must be carefully evaluated. In a clinical setting, TB health care providers need a sufficient and consistent set of questions to assess and address not only active smoking at time of smoking but also tobacco use prior to TB diagnosis or treatment.

We defined current smoking as active smoking within 3 months prior to TB diagnosis, based on the identified average number of days from start of symptoms to start of treatment in Pakistan. However longer delays have been reported, with studies in Pakistan reporting treatment delay of one year or more. In one study 26% of the study sample were diagnosed with TB at one year, and in another, 33.9% of the study sample took two years to be diagnosed.[60,61] In our study, 21% of the patients self-reported smoking one year before TB diagnosis. (Figure 2) As patients who quit are at increased risk for smoking again, and as both current and former smokers are at increased risk for treatment default and failure, smoking cessation treatment needs to be made available to current and former smokers in TB treatment settings.

For research objectives beyond assessment of smoking prevalence among patients, a clear definition of what a smoker is, and greater sensitivity and specificity of information on age of initiation, duration of

smoking and of quit attempts, on smoking intensity and patterns of smoking, are needed. Research efforts to reduce tobacco related morbidity and mortality among TB patients must also examine the social and cultural context of smoking behaviors, to develop effective cessation interventions.

Our study, conducted in partnership with the Pakistan National Tuberculosis Control Program and a local research organization, is an example of locally relevant operational research that can support national policy on TB control efforts and social changes on tobacco use and control. The data from our studies contributes to evidence on tobacco use and smoking prevalence among pulmonary TB patients in Pakistan. We hope it may have relevance for agencies responsible for the treatment of TB patients and prevention and control of more severe forms of the disease. The findings are directly relevant to the participating clinics as well, and may serve as a motivation to adopt smoking cessation treatments in their usual care of TB patients.

Reducing the joint burden of TB and smoking in Pakistan is a public health priority. Action to address smoking in this high risk population, tailored to local TB disease and smoking epidemiology is needed in Pakistan. Effective interventions will be those based on understanding local needs and conditions of those most at risk for developing and dying of TB disease, and of factors such as cigarette smoking that influence exposure to TB infectious droplets, the risk of being infected and progression from infection to active disease. Evaluation of tobacco smoking status and support for smoking cessation are essential in TB health care settings to improve clinical outcomes, reduce TB transmissibility, and improve patient prognosis and survival.

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Table 2.1: **Demographic characteristics and smoking behavior of survey respondents, stratified by current, former, and never smoking categories based on study definition of smoking status (N=963)**				
	Smokers n (%)	**Former Smokers n (%)**	**Never Smokers n (%)**	**P value**
Total	137 (14)	151 (16)	675 (70)	
Gender				**<.001**
Male	125 (23)	136 (25)	290 (53)	
Female	12 (3)	15 (4)	385 (93)	
Age				**<.001**
Mean ±SD	42 ± 14	40 ± 30	30 ± 23	
Median (IQR)	41 (30-50)	45 (30-60)	27 (20-40)	
18-25	26 (7)	25(7)	324 (86)	
26-40	42 (15)	45 (16)	197 (69)	
41-55	47 (26)	36 (20)	99 (54)	
>55	22 (18)	44 (36)	55 (45)	
Education **(Years of school completed)**				0.085
None	63 (13)	89 (18)	333 (69)	
1-8	49 (16)	43 (14)	211 (70)	
>8	25 (14)	18 (10)	131 (75)	
Monthly Income **(Pakistan rupees)****				0.117
0-4999	19 (14)	25 (18)	95 (68)	
5000-9999	57 (12)	75 (16)	334 (72)	
10,000 – 14,999	42 (19)	38 (17)	139 (63)	
>15,000	19 (14)	12 (8)	107 (78)	
Household Assets				**<.001**
≤2	45 (15)	73 (24)	192 (62)	
3-4	54 (16)	47 (14)	243 (71)	
5-10	38 (12)	30 (10)	240 (78)	
Cooking Fuel				**<.001**
Wood	52 (16)	83 (25)	203 (60)	
Animal Waste	54 (15)	47 (13)	265 (72)	
Compressed Natural Gas	30 (12)	17 (7)	201 (81)	
Clinic				**<.001**
Indus	21 (13)	22 (13)	121 (74)	
Kotri Inpatient	43 (15)	72 (25)	173 (60)	
Kotri Outpatient	24 (15)	33 (20)	107 (65)	
Malir	27 (15)	21 (12)	130 (73)	
SGH	22 (13)	3 (2)	144 (85)	
Patient Category				**<.001**
New	107 (15)	85 (12)	507 (73)	
Retreatment	30 (12)	62 (25)	164 (64)	
AFB Smear Results				0.827
Negative	28 (11)	43 (18)	174 (71)	
Scanty, 1+	32 (15)	32 (15)	140 (69)	
2+	26 (18)	19 (13)	99 (69)	
3+	38 (15)	39 (15)	180 (70)	

Alcohol Use				**<.001**
Yes	21 (52)	11 (27)	9 (22)	
No	111 (12)	134 (15)	650 (73)	
HIV status				0.682
Yes	2 (25)	1 (13)	5 (63)	
No	132 (14)	144 (15)	655 (70)	
Use Smokeless Tobacco				0.279
Yes	27 (16)	37 (22)	108 (63)	
No	107 (14)	112 (14)	560 (72)	
Daily passive outdoor tobacco smoke exposure				**<.001**
Daily	112 (20)	108 (19)	349 (61)	
Weekly or less	22 (7)	39 (12)	273 (82)	
Never	1 (2)	2 (4)	47 (94)	
Daily passive indoor smoke exposure				0.804
Daily	46 (14)	45 (14)	228 (71)	
Less than Weekly	8 (14)	7 (12)	43 (74)	
Never	83 (14)	96 (17)	399 (69)	

PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. AFB Acid fast bacilli

Table 2.2a: Prevalence of Smoking among 963 Adult Male and Female Pulmonary TB Patients in Karachi, Pakistan under Study Definition of Current Smoking

Overall Prevalence	**14.2% (95% Conf. Interval: 12, 17)**	
Gender	**Males: 22.5% (95% CI: 12, 26)**	**Females: 2.9% (95%CI:1, 4.5)**
Age		
18-25	13% (8, 17)	1% (.4, 2.5%)
26-40	23% (6, 29.5)	3% (.1, 6.4)
41-55	35% (27, 43)	7.9% (1.1, 1.5)
>55	24% (15, 33)	2.9% (2.8, 8.7)
Treatment Status		
New Retreatment	26% (21, 29) 16% (10, 21)	2.5% (.7, 4.2) 4.2% (.1, 8.4)

TB Patients who reported smoking within three months of the study interview

Table 2.2b: Prevalence of Smoking among 963 Adult Male and Female Pulmonary TB Patients in Karachi, Pakistan under Expanded Study Definition of Smoking

Overall Prevalence	**18% (95% Conf. Interval: 16, 20)**	
Gender	**Males: 28.5% (95%CI: 24.7, 32)**	**Females: 3.8% (95% CI:2.0 , 5.7)**
Age		
18-25	17% (11, 22)	1% (.4, 2.5)
26-40	29% (22, 36)	3% (.5, 7.6)
41-55	44.5% (36, 53)	9.5% (2.1, 17)
>55	30% (20, 39)	8.8% (.8, 1.8)
Treatment Status		
New Retreatment	32% (27, 36) 21% (15, 27)	2.9% (.1, 4.7) 7.4% (2.0, 13)

Patients who reported quitting smoking within six months of the study interview.

Table 2.3: Unadjusted and adjusted odds of predictors for current smoking among study patients who were smoking within three months of TB diagnosis

Variable		OR	P Value	AOR	P value
Age (years)		1.03 (1.02, 1.04)	**<.001**	**1.02 (1.01, 1.04)**	**<.001**
Age Categories					
	18-25	1		1	
	26-40	**2.2 (1.3,3.8)**	**0.002**	**1.9 (1.1, 3.4)**	**0.027**
	41-55	**4.7 (2.7, 7.8)**	**<.001**	**3.5 (2.0, 6.1)**	**<.001**
	>55	**2.9 (1.6, 5.5)**	**<.001**	**2.5 (1.2, 4.6)**	**0.006**
Gender, n (%)			**<.001**		
	Male	9.7 (5.2, 18)		**7.3 (4.0, 14)**	**<.001**
	Female	1		1	
Clinic, n (%)					
	Indus	1			
	Kotri Inpatient	1.2 (.65, 2.3)	.532		
	Kotri Outpatient	1.3 (.7, 2.20	.434		
	Malir	1.3 (.68, 2.4)	.451		
	SGH	1.07 (.6,2.04)	.838		
Education Categories (years completed)					
	None	.93 (.56, 1.54)	.781		
	1-8	1.2 (.71, 2.05)	.479		
	>8	1			
Monthly Family Income (PKR)					
	0-10,000	1.4 (.81, 2.7)	.198	.96 (.51,1.8)	0.91
	10000-15000	.87 (.51, 1.5)	.635	**1.58 (1.0, 2.4)**	**0.038**
	15,000+	1			
Alcohol Use , n (%)			**<.001**		
	Yes	**7.5 (3.9, 12)**		**3.9 (2.0, 7.9)**	**<.001**
	No	1			
Prior TB Disease, n (%)					
	Yes	.74 (.48, 1.1)	0.174		
	No	1			
HIV, n (%)					
	Yes	2.0 (.4, 10)	0.387		
	No	Ref			

Daily passive outdoor tobacco smoke exposure			
Daily	12 (1.6, 87)	**0.014**	**1.02 (1.01, 1.04)**
Weekly or less	3.3 (.4, 25)	0.250	
Never	Ref		
Daily passive indoor tobacco smoke exposure			
Daily	1.01 (.68,1.5)	.938	
Weekly or less	.96 (.44,2.1)	.935	
Never	Ref		

PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. OR Odds Ratio. AOR Adjusted Odds Ratio. CI Confidence Interval

Table 2.4 Demographic characteristics and smoking behavior of male survey respondents, stratified by current, former, and never smoking categories based on study definition of smoking status (n=551)				
	Smokers n (%)	**Former Smokers n (%)**	**Never Smokers n (%)**	**P value**
Total	125 (22.7)	135 (24.6)	291 (52.7)	
Clinic				
Indus	19 (24)	19 (24)	40 (51)	**<.001**
Kotri Outpatient	21 (23)	29 (32)	41 (45)	
Kotri Inpatient	40 (20)	63 (32)	96 (48)	
Malir	26 (26)	21 (21)	53 (53)	
SGH	19 (23)	3 (4)	60 (73)	
Age (in years)				**<.001**
Mean ±SD	42 ± 14.7	45 ± 16	33 ± 15	
Median (IQR)	41 (30-50)	45 (30-60)	28 (21-42)	
Age Categories				
18-25	24 (13)	23 (13)	136 (74)	
26-40	38 (24)	43 (27)	80 (50)	
41-55	42 (35)	31 (26)	46 (139)	
>55	21 (24)	38 (44)	28 (32)	
Education (Years of school completed)				0.085
None	52 (20)	76 (29)	130 (50)	
1-8	48 (28)	42 (22)	104 (54)	
>8	25 (26)	16 (16)	56 (58)	
Monthly Income (PKR)				0.023
0-4999	16 (23)	22 (30)	35(50)	
5000-9999	51 (19)	68 (25)	151 (56)	
10,000 – 14,999	39 (30)	35 (27)	54 (42)	
>15,000	19 (15)	10 (8)	50 (17)	
Household Assets				**0.037**
≤2	40 (20)	65 (32)	99 (49)	
3-4	47 (25)	40 (22)	99 (53)	
5-10	38 (24)	30 (22)	92 (58)	
Cooking Fuel				**0.002**
Wood	43 (19)	72 (32)	110 (48)	
Animal Waste	52 (27)	46 (24)	97 (50)	
Compressed Natural Gas	28 (23)	15 (12)	81(65)	
Patient Category				**0.003**
New	99 (26)	80 (21)	84 (52)	
Retreatment	26 (16)	53 (40)	205 (53)	
AFB Smear Results				
Negative	26 (19)	36 (26)	78 (56)	.888
Scanty, 1+	30 (26)	31 (25)	58 (21)	
2+	24 (26)	18 (20)	50 (54)	
3+	33 (22)	36 (24)	80 (54)	
Cough				0.405
Yes	119 (22)	132 (25)	279 (53)	
No	5 (27)	2 (11)	11 (61)	

Sputum				0.536
Yes	111 (23)	126 (26)	274 (56)	
No	8 (21)	7 (18)	8 (201)	
Alcohol Use				**<.001**
Yes	21 (53)	11 (28)	8 (20)	
No	99 (20)	119 (24)	274 (57)	
HIV status				0.803
Yes	2 (33)	1 (17)	3 (50)	
No	121 (23)	129 (24)	280 (53)	
Use Smokeless Tobacco				0.842
Yes	26 (20)	35 (27)	71 (54)	
No	97 (24)	99 (24)	218 (52)	
Daily passive outdoor tobacco smoke exposure				**0.029**
Daily	105 (23)	103 (22)	254 (55)	
Weekly or less	17(23)	29 (29)	29 (39)	
Never	1 (12.5)	2 (25)	5 (63)	
Daily passive indoor smoke exposure				0.857
Daily	40 (25)	36 (23)	84 (53)	
Less than Weekly	8 (28)	7 (24)	14 (48)	
Never	77 (22)	90 (25)	190 (53)	

PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. AFB Acid fast bacilli

Table 2.5: Unadjusted and adjusted odds of predictors of current smoking among male study patients who were smoking within three months of TB diagnosis							
	Current Smoker						
Variable	**Yes**	**No**	**OR**	**P Value**	**AOR**	**95%CI**	**P value**
TOTAL	125 (22.5)	427 (77.5)					
Age (years)			1.02	**0.002**	**1.03**	**1.02,1.05**	**<.001**
18-25	24 (13)	160 (87)	1				
26-40	37 (23)	124 (77)	1.9	**0.017**	**1.8**	**1.1, 3.9**	**0.018**
41-55	42 (35)	77 (65)	3.6	**<.001**	**4.1**	**2.1, 8.0**	**<.001**
>55	21 (24)	66 (76)	2.1	**.024**	**3.2**	**1.5, 6.7**	**0.002**
Education (years completed)							
None	52 (20)	207 (80)	.76	.340			
1-8	48 (25)	146 (75)	1.0	1.00			
>8	24 (25)	73 (75)	1				
Monthly family income (PKR)							
0-10,000	19 (24)	60 (76)	.75	.332	1.1	.62, 2.2	.607
10000-15000	39 (30)	89 (70)	1.38	.319	**1.6**	**.99, 2.5**	**.054**
15,000+	66 (19)	278 (81)	1				
Alcohol use				**<0.001**			
Yes	21 (53)	19 (48)	4.5		**4.0**	**2.0, 8.0**	**<.001**
No	98 (20)	395 (80)	1				
Previous TB disease							
Yes	26 (16)	137 (84)	.56	**0.016**	**.56**	**.35, .97**	**.041**
No	99 (26)	285 (75)	1				
HIV				0.537			
Yes	2 (33)	4 (67)	1.7		**6.1**	**.8, 47**	**.079**
No	120 (23)	411 (77)	1				

Daily passive outdoor tobacco smoke exposure				
Daily	105 (23)	358 (77)	2.05	0.503
Weekly	16 (21)	59 (79)	1.9	0.562
Never	1 (13)	7 (87)	1	
Daily passive indoor tobacco smoke exposure				
Daily	40 (25)	121 (75)	1.2	.369
Weekly	8 (28)	21 (72)	1.4	.431
Never	76 (21)	281 (79)	1	

PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. OR Odds Ratio. AOR Adjusted Odds Ratio. CI Confidence Interval

Table 2.6: Comparison of former smokers who quit 0-3 months and 4-6 months before study interview

	Smokers who quit 0-3 month's	Smokers who quit 4-6 months	P value
Total	89	36	
Gender, n (%)			0.278
Male	84 (94)	32 (89)	
Female	5(6)	4 (11)	
Age, n (%)			0.970
Mean ±SD	41 ± 15	45 ±15	
Median (IQR)	40 (30-50)	45 (29-52)	
18-25	19 (21)	7 (19)	
26-40	27 (30)	10 (33)	
41-55	28 (31)	12 (33)	
>55	15 (17)	7 (19)	
Education, n (%) (Years of school completed)			0.278
None	39 (44)	21 (60)	
1-8	32 (36)	10 (29)	
>8	18 (20)	4 (11)	
Monthly Income, n (%) (PKR) **			0.533
0-4999	12 (13)	6 (17)	
5000-9999	37 (42)	19 (53)	
10,000 – 14,999	29 (33)	10 (28)	
>15,000	11 (12)	1 (3)	
Household Assets, n (%)			0.616
≤2	33	17	
3-4	32	11	
5-10	24	8	
Cooking Fuel, n (%)			0.348
Wood	39 (44)	17 (49)	
Animal Waste	36 (41)	15 (43)	
Compressed Natural Gas	13(15)	2 (6)	
Clinic, n (%)			0.446
Indus	9 (10)	7 (19)	
Kotri Inpatient	40 ((45)	18 (50)	
Kotri Outpatient	18 (20)	4 (11)	
Malir	18 (20)	5 (14)	

SGH	4 (5)	2 (6)	
Patient Category, n (%)			0.327
New	67 (75)	24 (67)	
Retreatment	22 (25)	12 (33)	
AFB Smear Results, n (%)			0.419
Negative	20 (24)	4 (13)	
Scanty, 1+	23 (27)	9 (28)	
2+	20 (24)	7 (22)	
3+	20 (24)	12 (38)	
Alcohol Use, n (%)			0.108
Yes	12 (14)	1 (3)	
No	75 (86)	33	
HIV status			1.000
Yes	12 (14)	1 (3)	
No	75 (86)	34 (97)	
Use Smokeless Tobacco, n (%)			0.376
Yes	1 (1)	0	
No	86 (99)	34 (100)	
Daily passive outdoor tobacco smoke exposure, n (%)			0.330
Daily	70 (80)	26 (74)	
Weekly or less	18 (20)	8 (23)	
Never	0	1 (3)	
Daily passive indoor smoke exposure, n (%)			0.384
Daily	28 (31)	9 (26)	
Less than Weekly	8 (9)	1 (3)	
Never	53 (60)	25 (71)	

PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. AFB Acid fast bacilli

Table 2.7: Multivariate analysis of patient characteristics associated with smoking among 963 male and female pulmonary TB patients in Karachi, Pakistan, based on an expanded definition of current smoking *

	Current Smoker						
Variable	**Yes n (%)**	**No n (%)**	**OR**	**P Value**	**AOR**	**95%CI**	**P value**
TOTAL	173 (18)	789 (82)					
Age (years)					1.02	1.01,1.04	**<.001**
18-25	33 (9)	342 (91)	Ref				
26-40	52 (18)	232 (82)	2.3	**<.001**	**1.9**	**1.1, 3.1**	**0.011**
41-55	59 (32)	123 (68)	4.9	**<.001**	**4.0**	**2.3, 6.6**	**<.001**
>55	29 (24)	92 (76)	3.3	**<.001**	**2.3**	**1.2 , 4.2**	**.006**
Gender							
Male	157 (29)	393 (70)	9.9	**<.001**	**7.8**	**4.5 , 13**	**<.001**
Female	16 (4)	396 (96)	Ref				
Monthly family income (PKR) n (%),							
0-10,000	100 (17)	505 (83)	1.15	0.580			
10000-15000	53 (24)	166 (76)	**1.9**	**0.031**	**1.5**	**1.0, 2.4**	**0.035**
15,000+	20 (15)	117 (85)	Ref				
Alcohol use							
Yes	22 (54)	19 (46)	6.04	**<.001**	**2.9**	**1.5, 5.7**	**.002**
No	144 (16)	751 (84)	Ref				
Daily passive outdoor tobacco smoke exposure							
Daily	139 (24)	430 (76)	**7.8**	**0.005**			
Weekly	29 (9)	305 (91)	2.2	0.270			
Never	2 (4)	48 (96)	Ref				

*Patients who reported quitting smoking within six months before the study interview. PKR Pakistan rupees. 100 Pakistan Rupees per $1.17 in 2010. OR Odds Ratio. AOR Adjusted Odds Ratio. CI Confidence Interval

Table 8: Characteristics of TB Patients who Self-Reported Smoking at Time of Study Interview	
	Self-Reported Current Smoker n (%)
Total	49 (5)
Gender	
Male	41 (84)
Female	8 (16)
Age, Years	
Mean (SD)	43 (14)
Median (IQR)	45 (30-45)
Education (Years of school completed)	
None	24 (49)
1-8	18 (30)
>8	7 (14)
Monthly family income (PKR)	
0-4999	7 (14)
5000-9999	21 (43)
10000-19999	13 (26)
20000+	3 (6)
Prior TB Disease	8 (16)
Use Alcohol	9 (18)
HIV Diagnosis	1 (2)
Daily passive outdoor tobacco smoke exposure	41 (84)
Daily passive indoor smoke exposure	18 (36)
Number of manufactured cigarettes smoked per day, Median (IQR)	6.5 (3-20)
Amount spent on recent tobacco purchase, Median (IQR)	14 (5-20)
Have their first cigarette within 5 minutes of waking up.	7 (14%)
Want to quit within the next month	22 (45%)
Believe that quitting smoking will prevent chances of future TB infection	43 (88%)
Among those who tried to quit smoking	
Reasons for trying to quit	
Felt Sick	60%
Improve Health	13%
Save Money	7%
Influence from family/friends	7%

Table 2.9: Why former smokers quit	
Reasons why they stopped smoking	n, %
Felt Sick	99 (48)
Improve Health	75 (36)
Save Money	6 (3)
Influence from family/friends	10 (5)

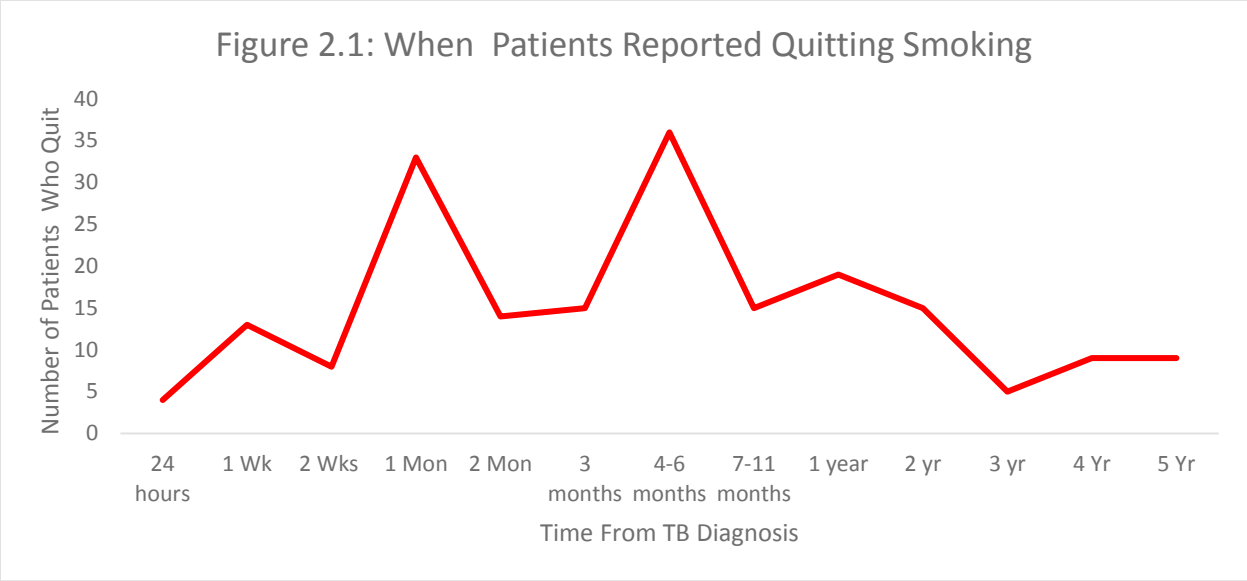
Figure 2.1: When Patients Reported Quitting Smoking
Number of Patients Who Quit
40
35
30
25
20
15
10
5
0
24 hours
1 Wk
2 Wks
1 Mon
2 Mon
3 months
4-6 months
7-11 months
1 year
2 yr
3 yr
4 Yr
5 Yr
Time From TB Diagnosis

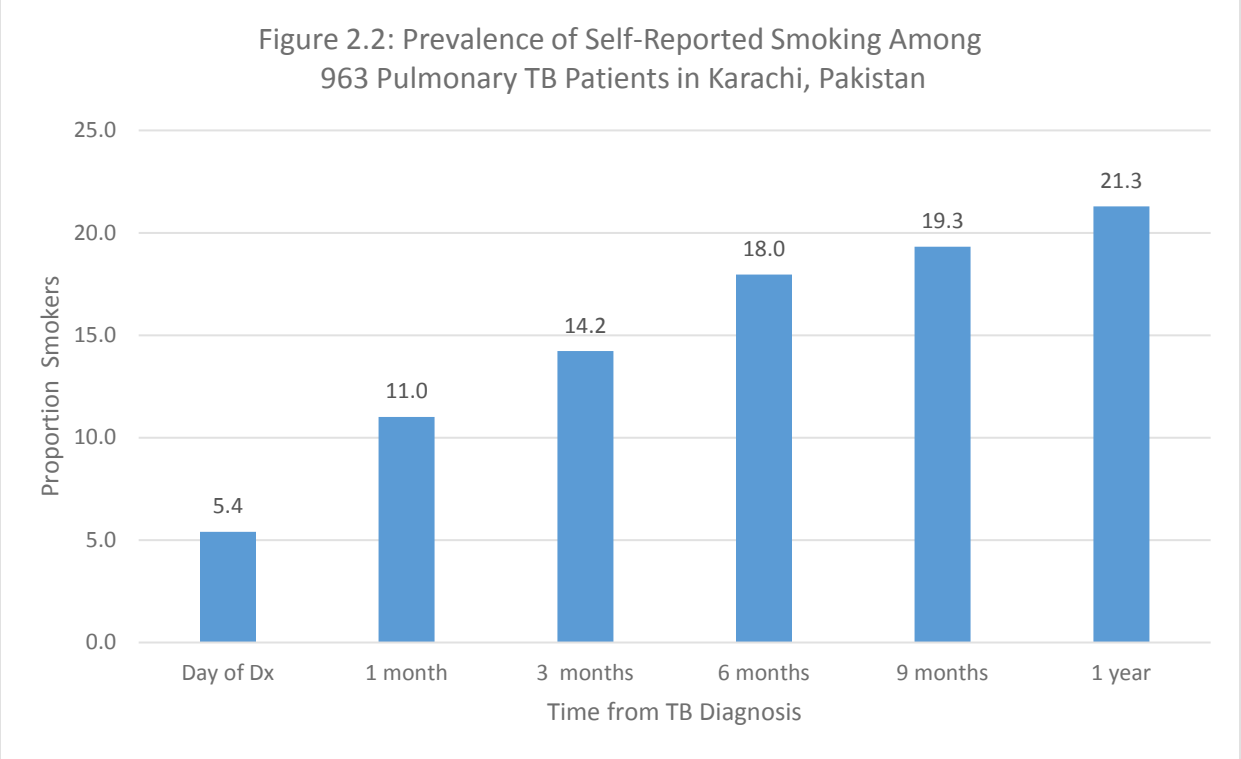
Figure 2.2: Prevalence of Self-Reported Smoking Among 963 Pulmonary TB Patients in Karachi, Pakistan
Proportion Smokers
25.0
20.0
15.0
10.0
5.0
0.0
5.4
11.0
14.2
18.0
19.3
21.3
Day of Dx
1 month
3 months
6 months
9 months
1 year
Time from TB Diagnosis

CHAPTER 3

Smoking behavior, knowledge and attitudes towards smoking cessation:
a cross-sectional survey of TB healthcare providers in Pakistan

3.1Abstract

Pulmonary tuberculosis (TB) patients who smoke are at increased risk for relapse, failure, and death.[1,2] The World Health Organization (WHO) and International Union against Tuberculosis and Lung Disease (IUTLD) recommend the incorporation of treatment for tobacco dependence in TB treatment programs and services. Implementation in low and middle income countries (LMIC) of healthcare services to encourage and support smoking cessation is limited.[34] TB healthcare professionals can contribute significantly to reducing tobacco use in TB patients.

Objective: Characterize beliefs, attitudes, and behaviors towards smoking and cessation treatment among health care providers at Directly Observed Therapy short course (DOTS) TB clinics.

Methods:

For this cross sectional study, a self–administered, anonymous 26 item healthcare provider survey that assessed smoking related beliefs and behavior, and attitudes towards smoking cessation for TB patients, was distributed to TB healthcare professionals at representative DOTS TB clinics in Pakistan, to explore clinician ability and willingness to provide effective smoking cessation interventions.

Results:

Ninety one physicians (29% of respondents of all surveys), 98 nurses (32%), 57 health workers (18%) and 64 clinic staff (21%) returned a completed survey (survey response rate of 78%). While all providers viewed smoking as being harmful to patient health, and the majority of physicians (82%) strongly agreed it was their responsibility to assess patient smoking, less than half (42%) were knowledgeable about the risk of smoking on TB. The majority of health care provider (59% of physicians) always asked patients about their smoking behavior. A third of physicians believed TB patients were interested in quitting (28%) or would be successful in quitting smoking (33%).

Conclusions:

This study is one of the few to explore the behaviors and attitudes of health care providers at DOTS TB clinics in Pakistan towards smoking and smoking cessation. Providers believed that cigarette smoking is harmful, but were not knowledgeable about the impact of smoking on TB disease. And while they asked about smoking behavior, care providers believed there was not enough time during patient visits to provide cessation counseling. Most physicians believed that TB patients were not interested in quitting smoking.

To make smoking cessation a priority during patient interactions, health care providers' should receive training on tobacco smoking among TB patients, and the effects of smoking on TB as well as on the benefits of quitting smoking. Training on simple smoking cessation methods for all health care providers at TB clinics, from clinicians to clinical staff, can increase frequencies of discussing smoking and smoking cessation with patients, foster positive attitudes towards providing smoking cessation, and increase confidence in treating smoking.

3.2 Introduction:

TB remains a global public health threat, especially in low and middle income countries.[3] In these high TB countries, tobacco smoking is an increasingly common behavioral risk factor.[4,5] Epidemiologic studies have shown that cigarette smoking doubles the risk of infection with TB, progression to active disease and risk of death from TB. [6-8] It is estimated that 16-20% of new cases of TB are attributable to smoking.[9] TB patients who smoke are also at increased risk for relapse and treatment failure, as they are less adherent to TB treatment.[10] There is an urgent need to provide cessation interventions to patients with TB who smoke.[11] Implementation of effective tobacco cessation interventions for at risk TB patient populations is based on understanding the barriers to and facilitators of smoking cessation.

Evidence based smoking cessation guidelines recommend that physicians actively work with each smoker to achieve smoking cessation.[12,13] In 2007, with growing evidence for smoking as an important and highly prevalent risk factor for TB morbidity and mortality, the World Health Organization (WHO) and International Union Against Tuberculosis and Lung Disease (IUTLD) recommended the integration of treatment for tobacco dependence into TB treatment programs and services.[14] The critical need for smoking cessation treatment for smokers was demonstrated by the WHO Framework Convention on Tobacco Control, the international evidence based public health treaty ratified by 180 countries. Among the 13 strategies for member countries to adopt to reduce tobacco consumption is the requirement to implement smoking cessation programs, especially at educational and health institutions. [15]

The health care setting is recognized as a successful means of reaching smokers with cessation messages and promoting continued abstinence from tobacco use.[16] Concern about health is shown to be one of the strongest motivators for quitting smoking. [17] A health event such as a diagnosis of TB presents a 'teachable moment', where patients are receptive to changing negative health behaviors.[18,19] Physicians and other healthcare workers can be effective in promoting smoking cessation.[20] Not only are they viewed as important role models for healthy behaviors [21-22] but patients expect that health care providers will ask about tobacco use and give guidance on how to quit.[23, 24] Individual level cessation interventions

such as physician advice, behavioral counseling and cessation counseling with supportive contact, are effective in reducing cigarette smoking, and significantly increase the probability of long term smoking cessation. [25-29]

However, implementation of research findings and guidelines into practice is a slow process.[30,31] Few low and middle income countries (LMIC), where the majority of smokers are now found,[32] have developed tobacco addiction treatment services, and evidence on effective cessation interventions for the general population in these countries is limited. [33-35] In high TB burden, low resources countries, interventions for smoking cessation including counselling for TB patients who smoke are not routinely implemented in clinical practice.[19, 36] The focus of TB control programs is finding and treating active TB disease cases. Treating tobacco use in TB patients is not considered a priority in TB control efforts, or an effective use of limited resources.[37] The detrimental effects of tobacco use on TB disease and treatment are often not well known to TB health care providers, and clinicians who treat TB usually do not address patient smoking behaviors as part of their routine medical care.[38] Tobacco use messages given to TB patients are general in nature, fail to provide information on the impact of smoking on TB and do not emphasize quitting permanently. [39-41]

While TB healthcare providers can have a significant impact on reducing the prevalence of smoking in the TB patient population, [42-44] there are numerous factors that influence health care delivery. Clinicians' beliefs and knowledge as well as patient views and preferences, and the interaction between health care professionals and patients, are important components in providing smoking cessation services.[45] Possible barriers for providers to offering cessation interventions include smoking behavior of the health care professional, his/her lack of training, competing priorities, lack of time, and attitudes and beliefs about patient interest, and the physician's role in delivering smoking cessation interventions.[46, 47] Studies among patient populations have found that smokers want their physician to address their smoking, and would participate in cessation program if provided. [48] Patients also look for specific advice about the harmful

effects of smoking, targeted strategies to quit smoking and stay quit, as well as respectful, empathetic support.[38, 49]

Pakistan, a low middle income country (LMIC), has high TB incidence and rapidly increasing smoking rates. It ranks fifth among the world's 22 high TB burden countries, with 510 new cases of TB per 100,000 people per year.[50] Overall tobacco smoking prevalence among adults is 19%, with 22% of adult males' being daily, current smokers.[51]

There is little research in Pakistan on TB health care providers' attitudes towards tobacco use, knowledge of the risks of smoking on TB, and the smoking cessation practices of clinicians attending at DOTs TB treatment clinics. Knowledge of potential barriers and facilitators to implementing smoking cessation treatment is needed for the development of effective smoking cessation interventions for TB patients in Pakistan.

Ethics

Ethics approval was obtained from the institutional review boards of Indus Hospital, Karachi, Pakistan, and the Johns Hopkins Bloomberg School of Public Heath, Baltimore, MD.

3.3 Methods

3.3.1 Design

TB health care providers in government run DOTS clinics in Karachi, Pakistan, were surveyed through an anonymous, self-administered questionnaire to describe their knowledge, attitudes, and practice of tobacco smoking and tobacco control. After gaining approval from hospital or clinic administrators, surveys were either distributed to physicians and nurses and staff at monthly staff meetings, or given to clinic administrators to distribute to clinic staff and clinicians. At smaller clinics, clinicians and staff

were directly were invited to participate in the survey. The completed questionnaires were then collected by the researcher or the study manager.

3.3.2 Study population: The study population included physicians, nurses and non-clinical staff such as pharmacists, treatment facilitators, registrars, and community health workers, who treat and work with TB patients at government DOTS treatment centers.

3.3.3 Setting: The provider survey was conducted at TB treatment sites representative of available TB services in Pakistan. We surveyed multiple types of providers at Indus Hospital TB Clinic, the Institute of Chest Disease, Kotri, Indus Hospital TB clinic, Malir Chest Clinic, OJHA and Sindh Government Hospital TB clinic, New Karachi. These clinic sites were part of our earlier smoking prevalence study conducted in 2010.

We also distributed the survey at a district hospital (THQ Hassanabdal) and tertiary care hospitals in Karachi, Rawalpindi and Islamabad (Civil Hospital, Jinnah Post Graduate Medical Center, Karachi; the Federal Government TB Centre, Rawalpindi; Pakistan Institute of Medical Sciences, Shifa Hospital, Islamabad).

Approximately 400 provider surveys were distributed to TB treatment sites with varying numbers of providers. Sites were conveniently selected, and believed to be representative of DOTS TB providers in Pakistan. Tertiary care hospitals have larger numbers of clinical and non-clinical staff. Blank surveys were taken to clinics by a study team member and collected after completion.

3.3.4 Survey instrument: Provider's behavior, attitudes, knowledge and beliefs on tobacco use and cessation interventions were measured by a self-administered, structured questionnaire. The questionnaire was a modified version of the WHO Global Health Professionals Survey, which is designed to assess prevalence of cigarette smoking and other tobacco use, knowledge and attitudes about tobacco use, and

training received regarding patient counseling on smoking cessation techniques among health profession students. Questions on the association between tobacco use and TB were added.

The 26 item instrument included questions on sociodemographic variables, personal smoking history, beliefs about patient smoking behaviors, knowledge about the relationship between smoking and TB, beliefs about the health professional's role in smoking cessation, knowledge of smoking cessation methods, and beliefs about their effectiveness.

Self-report items were used to assess age, sex, type of provider, and years in practice. For data analysis, provider types were categorized as physician, nurse, health worker, and non-clinical staff.

Smoking status was measured by one item, "What describes your smoking behavior? I currently smoke, I quit smoking, I have never smoked." Respondents were coded as current smokers, former smokers or never smokers. The survey took approximately 10 minutes to complete.

Questions on knowledge, beliefs, and attitudes were rated on 5 point Likert scales. Response options ranged from 1= "strongly agree", "always", "very successful", or "very important", to 5="strongly disagree", "never", "not successful", and "not at all important".

Knowledge of the relationship between smoking and TB was assessed by the question "People who smoke are more likely to develop tuberculosis or experience a recurrence of TB than non-smokers."

Attitudes toward the role of health care providers in assisting TB patients with smoking cessation was measured by the questions "A patient's chance of quitting smoking is increased if their doctor advises him or her to quit" and "How important is smoking cessation counseling as part of a TB program?" Providers were asked about the frequency with which they assessed patient smoking, "How often do you ask your patients if they smoke" and perceived success of patients quitting smoking, " How successful do you think you TB patients would be if they tried to quit smoking?". The Likert –scale item "I feel I am able to help my patients quit smoking" was used to assess provider confidence in cessation counseling ability.

Questions on perceived barriers to addressing smoking in TB patients included patient's level of interest, provider knowledge of smoking cessation methods, and sufficient time during patient visits. Belief of effectiveness of various cessation treatment methods was assessed by the Likert type item "How effective do you think the following methods are to help TB patients who smoke quit? Responses ranged from 1="very effective to 5 = "not at all effective". Providers were also asked to estimate the percent of patients who smoke cigarettes, as well as the percent of their co-workers who smoke.

3.3.5 Analysis: Descriptive statistics were calculated to characterize provider characteristics, frequency of smoking assessment, knowledge, attitudes, beliefs, and barriers to smoking cessation. Analysis of variance and $\chi 2$ statistics were used to compare frequencies of responses between the different types of providers – ie physicians, nurses, non-clinical health workers.

Age and years in practice were measured as a continuous variable, in years, and also categorized into groups. Age was categorized into four age groups - 18-25, 26-40, 41-55, > 55. Years in practice was categorized into four time intervals - < 5 years, 5-10 years, 11-20 years, > 20 years.

Two questions that were either partially completed or left entirely incomplete by respondents were not included in the analyses. The questions asked providers to rank 1) topics they discussed with patients during a patient visit – HIV, nutrition, tobacco use, alcohol use, family planning, other; and 2) what would encourage them to discuss smoking cessation – reimbursement for time, lower patient loads, free nicotine replacement therapy, mandate from the NTP, options for referral.

3.4 Results

3.4.1 Provider Survey Results:

Of approximately 400 provider surveys that were distributed, a total of 313 surveys were returned, a response rate of 78%. Table 1 describes the characteristics of the health provider survey respondents. 91 physicians (29% of completed surveys), 98 nurses (32%), 57 health workers (18%) and 64 clinic staff (21%) returned a completed survey. The majority of physicians were male (70%), and almost all nurses

were female (94%). Similar proportions of male and female health worker and clinic staff participated. The age distributions of physicians, nurses and health workers were similar, with the median age of physicians 36 years (Interquartile range (IQR 30-50), and 34 years (IQR 30-37) for nurses and health workers. Clinic staff were slightly younger, with a median age of 28 years. The median number of years physicians and nurses had been in practice was 10 (IQR 4-21 years), and health workers and clinic staff slightly less, with a median of eight years (IQR 3-15).

Lifetime (ever) tobacco smoking prevalence in the whole was reported by 10% of the providers. The overall prevalence of current smoking among health professionals in the study sample was 5% (95%CI: 2, 8). Current smoking was more prevalent among males (12.5%) and among clinic staff (10%) and health workers (10%). Very few physicians or nurses in our sample reported current smoking. Among 91 physicians, four (4%) said they were current smokers, six (7%) were former smokers, and all of the physicians who were smokers were male. Among 98 nurses, two of the six male nurses were smokers, while no female nurses reported ever smoking.

The majority of all types of health providers reported seeing more than 20 patients a day, and fewer than 10 TB patients a day. Most providers spent between 15-20 minutes per visit when seeing a TB patient. Physicians estimates of smoking among their patients ranged from 30-70% (mean=49%); they believed that approximately a quarter (24%) of other physicians smoked. Nurses estimated only a quarter of patients (26%) were smokers and that 9% of nurses smoked.

Association of smoking with health and TB

Table 2 shows physicians and nurses' knowledge of smoking and TB. Among physicians, 97% strongly agreed that smoking was harmful, but the responses of nurses were more ambivalent. While 39% strongly agreed that smoking was harmful, almost a quarter (22%) of nurses disagreed. Overall, almost all health care providers strongly agreed or agreed that smoking was harmful (Figure 1). Physicians were less sure about the relationship between smoking and TB, with only 42% strongly agreeing that smokers were more likely to develop TB. Nurses were again divided about the relationship between smoking and TB,

with about one third of nurses disagreeing with the statement. (Table 2 and Figure 2). Health workers and clinic staff strongly agreed that smoking was harmful (64% of health workers and 92% of staff), and that smoking increased the risk for developing TB (51% and 61% respectively).

Attitudes of health professionals

Attitudes towards the role of health care professionals in smoking cessation, shown in Table 3, differed between physicians and nurses. Most physicians (82%) strongly agreed it was their responsibility to ask about smoking, and more than half (59%) felt it was very important that smoking cessation be included in TB treatment programs. But only 47% of physicians believed that a patient was more likely to quit with the help of a doctor. Among nurses, only 28% strongly agreed that health care professionals should routinely ask about smoking among their patients, while 41% had no opinion about a professional's responsibility to assess smoking. 17% of nurses did not agree that health professionals should assess smoking among patients. More than half of health workers and staff felt that it was their responsibility to ask about smoking among TB patients. Approximately a third of nurses (36%) felt that it was very important to provide smoking cessation at TB clinics, and another third felt it was unimportant or not important. In terms of confidence in their ability to help patients quit smoking, a third (36%) of physicians and a quarter (24%) of nurses strongly agreed they could help patients quit smoking. A third of nurses (29%) and 18% of physicians had no opinion, and 22% of physicians and 36% of nurses disagreed or strongly disagreed they were able to help patients quit smoking.

Again, more than half of health workers and staff strongly felt that smoking cessation treatment should be provided at TB clinics. Almost 50% believed that patients would be more likely to quit with advice from a physician. But they were less confident they could help a patient quit smoking, with 19% of health workers and 16% of staff disagreeing with the statement.

Barriers to smoking cessation

Barriers to providing cessation interventions are reported in Table 4. Physicians viewed patient related

barriers (lack of interest, ability to quit smoking) as well as lack of time as key barriers to smoking cessation. Only 28 % believed patients were very interested in quitting, and 33% percent felt patients would be very successful if they tried to quit smoking. And while a third (31%) of physicians strongly believed there was enough time to discuss smoking cessation with patients during a patient visit, 25% expressed no opinion and another 27% disagreed or strongly disagreed. Among physicians, 55% strongly agreed they were knowledgeable about cessation methods and 59% said they always asked their patients about smoking.

For nurses, training in cessation methods and lack of time were important barriers to providing cessation interventions. Only 22% of nurse strongly agreed they were knowledgeable about smoking cessation methods, and 23% strongly agreed there was enough time in a patient visit to discuss smoking cessation. Conversely, more than half of nurses (55%) strongly agreed that patients were interested in quitting smoking and 50% felt they would be successful if they tried to quit.

Among health workers, 40 % strongly agreed they were knowledgeable about cessation methods, and 45% always asked their patients about smoking. Comparable to nurses, the majority of health workers (67%) strongly agreed that patients want to quit smoking, though fewer (41%) believed they would be successful. Only a quarter felt there was enough time in patient visit to discuss smoking cessation,

Most clinic staff strongly agreed (62%) they were knowledgeable about smoking cessation methods, a third (34%) believed there was enough time in a patient consultation to discuss smoking cessation, and approximately a third (39) strongly agreed patients were interested in quitting and would be successful. But almost a third of health workers (33%) and 24% of clinic staff did not ask about patient smoking.

Effective cessation methods

Opinions of effective cessation treatment methods are shown in Table 5. Physicians believed that counseling by a physician (40%) or group counseling (46%) were very effective smoking cessation treatment methods. Nurses were evenly divided among the four methods listed on the survey, with about a

quarter of nurses finding either counseling by physician, group counseling, smoking quitline or nicotine patch/gum to be very effective. A third of physicians (36%) and 22% of nurses felt that medication for smoking cessation treatment was very ineffective.

Health workers and clinic staff believed telephone quitlines were very effective cessation methods, as well as group counseling. Few among clinic staff (22%) believed physician counseling to be very effective.

3.5 Discussion:

Our survey of health providers at clinics where TB patients are diagnosed and treated found all types of providers (physicians, nurses, health workers, clinic staff - registrar, pharmacists, treatment supporters) agreed that smoking was harmful to patient health. Self-reported smoking prevalence in our sample was 5%, with very few physicians reporting tobacco use, though they believed that 20% of physicians overall were smokers. Eighteen percent of health workers and clinic staff were current smokers and 12% were former smokers. Physician smoking behavior has been shown to be a barrier to providing smoking treatment.[20, 52] The study rate of smoking among health care professionals was significantly lower than findings from other studies. High rates of tobacco use have been reported by physicians and other healthcare providers in LMIC.[53] In Pakistan, the prevalence of smoking in healthcare professionals has been found to range from 32 – 37%, and 50% among male physicians.[54, 55]

There may have been underreporting of smoking behavior by physician respondents in our study since 30% of physicians in our sample were female, and females in Pakistan are less likely to smoke. Physicians may have also not reported smoking behavior because they were working at a TB/respiratory clinic. But our study findings suggest that chest physicians/pulmonologists may have lower rates of tobacco smoking, with more positive attitudes towards smoking cessation.

Among clinicians, the majority of physicians believed it was their responsibility to ask their patients about their smoking habits, and that smoking cessation counseling should be included in TB treatment

programs. Approximately half of the physicians and nurses in our study always assessed patient smoking, and more than half of the physicians felt confident in their knowledge of smoking cessation methods. But, even though physicians at these clinics believed that 30-70% of their patients were smokers, most also believed that TB patients were not interested in quitting and would be unable to stop smoking. Two thirds of physicians felt there was not enough time in a patient visit to discuss smoking, and only a third of physicians believed they could help patients stop smoking. Nurses in our study were less sure of their knowledge of smoking methods and their role in providing smoking cessation counseling. But they had higher positive expectations regarding patients desire to quit smoking and being successful at quitting. The more positive assessment of patient intentions and ability by nurses may reflect their greater involvement in treatment of patients and follow-up as well as in educating patients about TB.[56]

The majority of non-clinical personnel (health workers and clinic staff) strongly agreed that smoking was hazardous for TB patients, and that health professionals should assess smoking behaviors of patients. They believed cessation interventions should be provided at TB clinics, that patients would be more likely to quit with physician counseling, they could help a patient quit, and that they were knowledgeable about cessation methods. Health workers and non-clinical staff may have been more conscious of the harms of smoking as more of them were self-reported current or former smokers. They are also more likely to work with TB patients in clinic setting- to support treatment adherence, or to guide patients through the clinic during registration and follow up visits, and may have had a higher awareness of TB patients smoking behaviors and concerns.

It is also possible that some of the health workers and non-clinical staff who completed the survey may have been employed at the clinics where our earlier study on smoking prevalence was conducted, in the previous year. They may have either assisted with the prevalence survey or been exposed to the interviewers, and so had more awareness of the health issues associated with smoking and TB patients, as well as the study goals. This may have impacted our study findings on health worker and clinical staff

beliefs and attitudes. However, if so, our finding may indicate the ease by which smoking cessation interventions may be taken up by clinic staff.

Our findings reflect barriers that have been reported by other studies, on physicians providing smoking cessation counseling.[57-59] Factors that have been cited most often were limited time with patients, lack of patient motivation, physician smoking behavior, physician confidence in ability and knowledge of smoking cessation methods.

In our study, lack of time, expected negative patient response, and negative expectations of effectiveness were perceived as key barriers to delivering smoking cessation counseling by health care providers. Lack of sufficient training in smoking cessation and smoking among health care professionals were less frequently reported.

Important study findings were the identification of negative provider beliefs and attitudes that may impact discussion of smoking cessation with their patients, and the knowledge gap related to TB and the health hazards of tobacco smoking. While most physicians and nurses believed that smoking was harmful, fewer believed smoking increased the risk of developing TB.

In time limited patient consultations, physicians prioritize topics to discuss with a TB patient, such as the effects of the TB medication, adherence to TB treatment, nutrition needs. Increased knowledge of the specific mechanisms by which smoking effects TB disease and treatment, and of the necessity for pulmonary TB patients to quit smoking, may influence healthcare professionals' judgement about providing smoking cessation.

Quitting smoking has significant health benefits for patients with pulmonary TB disease.[11] TB healthcare professionals can play an important role in the identification, assessment and treatment of TB patients who are smokers.[20,60] Physicians and other healthcare professionals can increase quit rates among patients who smoke.[61-64]

Evidence from randomized clinical trials examining behavioral treatments for smoking cessation shows that a brief, three minute counseling session by a physician can increase the odds of prolonged abstinence by 30% compared with no counseling.[65] Cessation treatment guidelines recommend working with a patient who smokes over a period of time, within and outside the treatment setting, and using a counseling/advising approach to identify ways to maintain abstinence and develop effective strategies to prevent smoking relapse.[12, 19]

Limitations of our study include the cross sectional study design. We adapted a widely used survey instrument, but the validity of our instrument was not studied formally in our study population. We attempted to limit social desirability bias in responses by making the questionnaire anonymous, but cannot assess the amount of over reporting of positive attitudes and under reporting of smoking behaviors. And while our survey asked about knowledge of smoking cessation methods, we did not assess how many offer cessation advice to patients who smoke.

We examined the barriers and facilitators to providing smoking cessation treatment to TB patients at DOTS TB clinics in Karachi, Pakistan. Healthcare professionals' lack of knowledge of smoking hazards associated with TB, and negative beliefs regarding time available to discuss smoking, lack of interest by patients to quit smoking, and inability of patients to successfully quit smoking were provider related barriers..

There is little research in Pakistan on TB health care provider's attitudes towards tobacco use, and the smoking cessation practices of clinicians attending at DOTs TB treatment clinics. Our study adds to the knowledge of factors that may impact integration of smoking cessation and TB treatment services.

Training in cessation methods for all health care providers at TB clinics, from clinicians to non-clinical staff, can increase frequencies of discussing smoking and smoking cessation with patients, foster positive attitudes towards providing smoking cessation, and increase confidence in treating smoking. In addition

offering smoking cessation treatment to health care providers at TB treatment centers can change provider attitudes and perceptions of smoking and cessation

Sustainable smoking cessation interventions for TB patients will depend on a deeper understanding of both patient and health provider needs and expectations, and on the context and conditions of health care delivery.

Table 3.1: Characteristics of Health Provider Survey Respondents

	Physicians n (%) n= 91 (29)	Nurses n (%) n= 98 (32)	Health Workers n (%) n=57 (18)	Clinic Staff n (%) n=64 (21)	p-value
Gender					<0.00
Male	64 (70)	6 (6)	30 (53)	36 (56)	
Female	27 (30)	92 (94)	27 (47)	28 (44)	
Age (yrs), Mean ±sd	39 ± 11	34 ± 7	35 ± 8	31 ± 9.7	<0.00
Median (IQR)	36 (30-50)	34 (30-37)	34 (29-43)	28.5 (24-38)	
Age Categories					<0.00
20-28 yrs	19 (21)	16 (16)	11 (19)	31 (48)	
29-38 yrs	26 (29)	59 (60)	20 (35)	16 (25)	
39- 48 yrs	18 (20)	15 (15)	20 (35)	9 (14)	
>48 yrs	28 (30)	8 (8)	6 (11)	8 (13)	
Numbers of Years in Practice					
Mean ±SD	13.5 ± 10	10.5 ± 6	10 ± 9	10.6 ± 9	<0.00
Median (IQR)	10 (4-21)	10 (6-15)	8.5 (4-15)	8 (3-15)	
Smoking Status					0.0784
Current	4 (4)	1 (1)	5 (9)	7 (11)	
Former	6 (7)	1 (1)	4 (7)	3 (5)	
Never	81 (89)	96(98)	47 (84)	54 (84)	
Number of patients seen per day					0.000
<10	8 (9)	2 (2)	20 (36)	13 (21)	
10-20	24 (27)	13 (13)	9 (16)	13 (21)	
>20	58 (64)	83 (85)	27 (48)	36 (58)	
Number of TB patients seen per day					0.008
<10	50 (56)	46 (47)	36 (69)	46 (74)	
10-20	26 (29)	38 (39)	8 (15)	12 (19)	
>20	14 (16)	13 (13)	8 (15)	4 (7)	
Time spent with each TB patient					0.214
5-10 Minutes	35 (39)	23 (25)	17 (31)	20 (35)	
15-20 minutes	37 (42)	53 (56)	22 (40)	26 (46)	
>30 minutes	17 (19)	18(19)	16 (29)	11 (19)	

Believe what percent of patients smoke					0.025
Mean + SD	49% ± 25	26% ± 28	29% ± 26	44%± 24	
Median (IQR)	50% (30-70)	10% (5.5-50)	20% (10-50)	50% (20-60)	
Believe what percent of co-workers smoke					0.192
Mean + SD	24% ± 22%	9% ±11%	11% ±14%	26% ± 23%	
Median (IGR)	20% (10-30)	5% (2-11)	4.5% (2-15)	15% (7-50)	

Table 3.2: Knowledge of the Association between Smoking and TB						
Smoking is harmful to health						
	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	P value
						<.000
Physicians	87 (97)	1 (1)	1(1)	1 (1)	1 (1)	
Nurses	37 (39)	15 (16)	23 (24)	11 (12)	10 (10)	
Health Workers	25 (64)	3 (8)	4 (10)	1 (3)	6 (15)	
Clinic Staff	59 (92)	2 (3)	1 (2)	0	2 (3)	
People who smoke are more likely to develop tuberculosis or experience a recurrence than non-smokers						
Physician	38 (42)	25 (28)	19 (21)	6 (7)	2 (2)	0.004
Nurses	36 (33))	23 (19)	18 (18)	15 (14)	15 (114)	
Health Workers	21 (51)	4 (10)	7 (17)	5 (12)	4 (10)	
Clinic Staff	38 (61)	8 (13)	10 (16)	3 (5)	3 (5)	

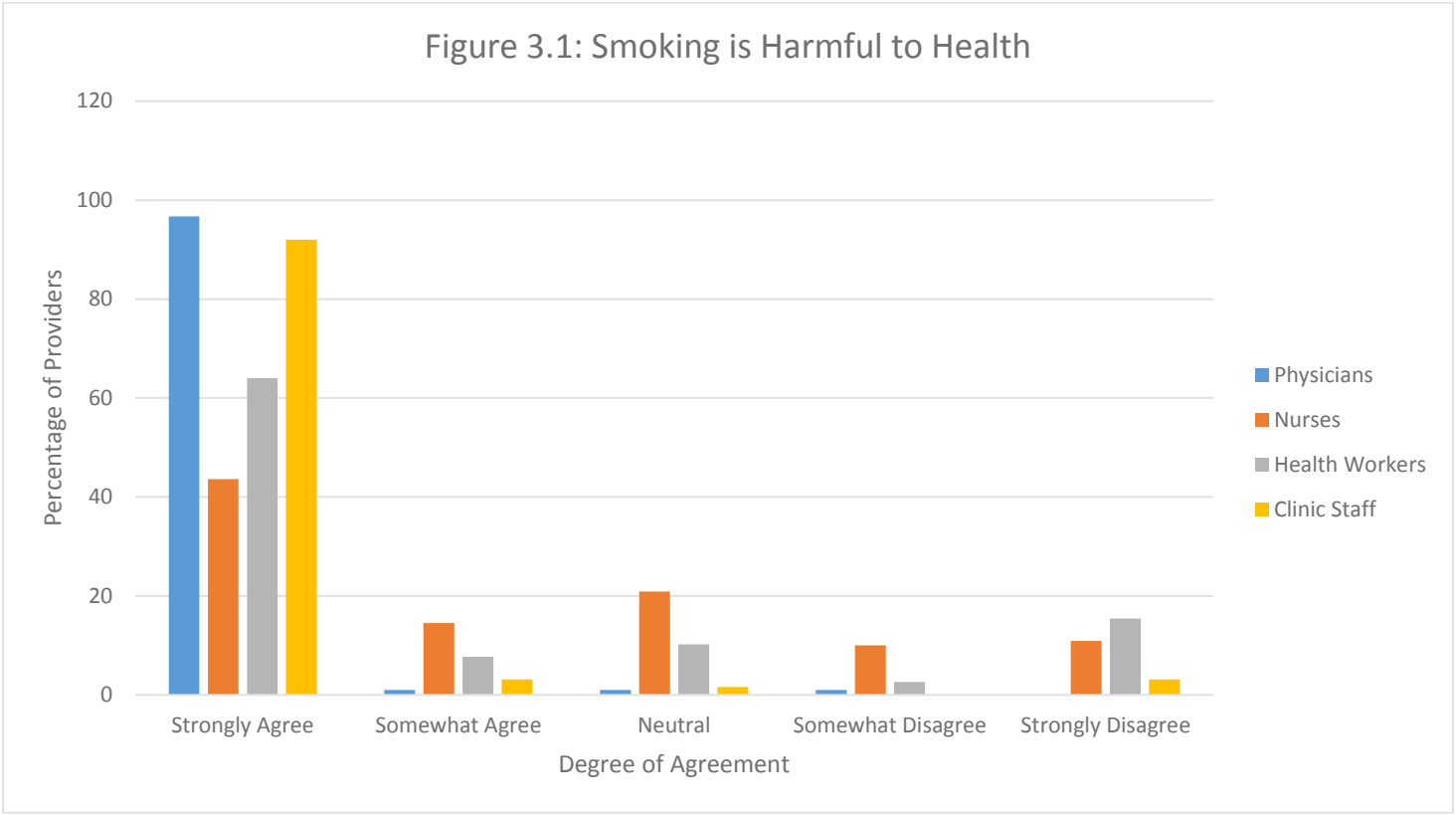
Figure 3.1: Smoking is Harmful to Health
120
100
80
60
40
20
0
Percentage of Providers
Strongly Agree
Somewhat Agree
Neutral
Somewhat Disagree
Strongly Disagree
Degree of Agreement
Physicians
Nurses
Health Workers
Clinic Staff

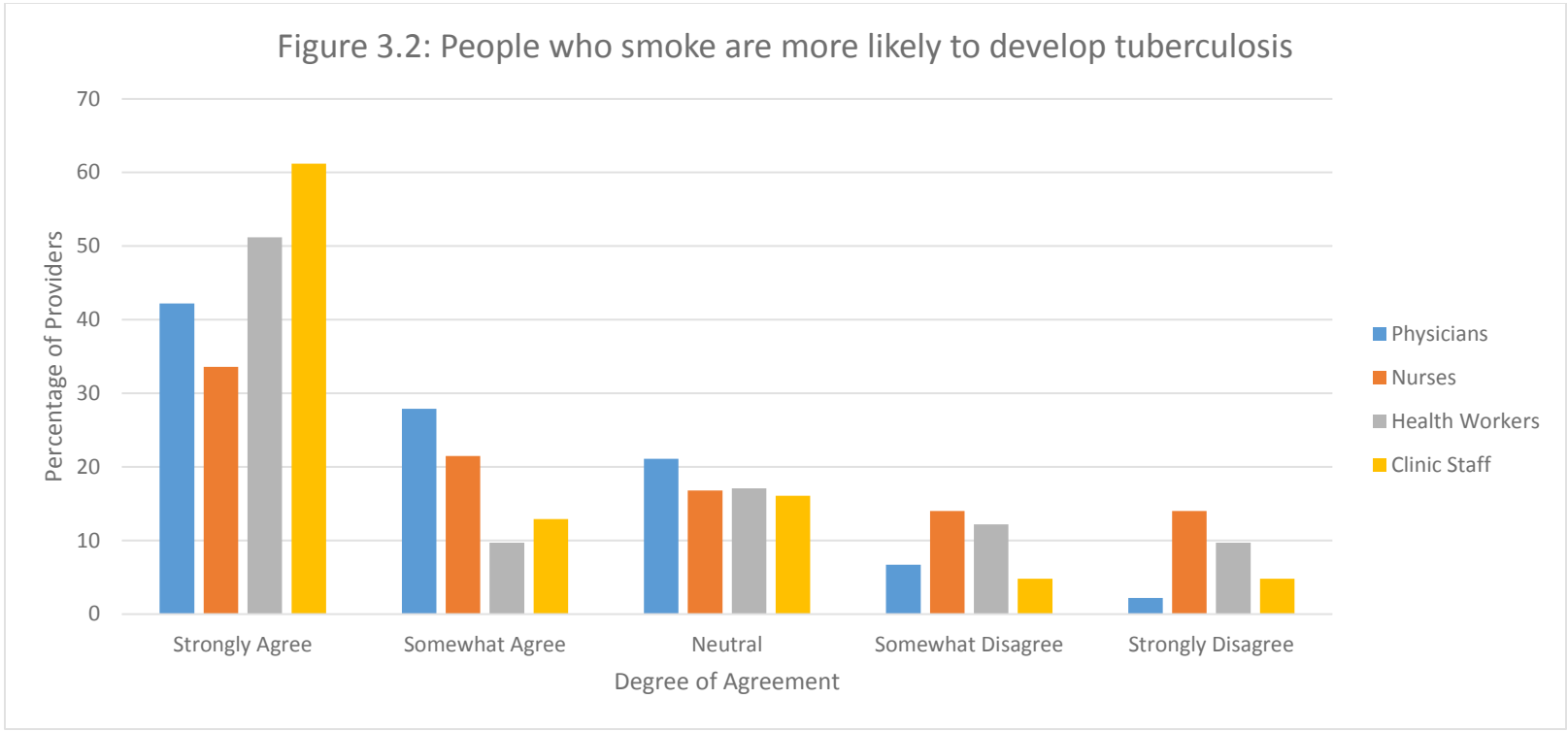
Figure 3.2: People who smoke are more likely to develop tuberculosis
70
60
50
40
30
20
10
0
Percentage of Providers
Strongly Agree
Somewhat Agree
Neutral
Somewhat Disagree
Strongly Disagree
Degree of Agreement
Physicians
Nurses
Health Workers
Clinic Staff

TABLE 3.3: BELIEFS ON THE ROLE OF THE CLINICIAN IN SMOKING CESSATION (%)						
	Strongly Agree	**Somewhat Agree**	**Neutral**	**Somewhat Disagree**	**Strongly Disagree**	P value
It is the responsibility of health professionals to routinely ask about their patients smoking habits						<.000
Physician	75 (82)	6 (7)	6(7)	1 (1)	2 (3)	
Nurses	34 (32)	14 (13)	40 (37)	8 (7)	11 (10)	
Health Workers	20 (51)	7 (18)	5 (13)	0	7 (18)	
Clinic Staff	54 (84)	3 (5)	4 (6)	2 (3)	1 (2)	
Patients' chances of quitting smoking are increased if their doctor advises him or her to quit						.031
Physician	43 (47)	16 (18)	17 (19)	10 (11)	5 (5)	
Nurses	35 (32)	16 (15)	19 (17)	19 (17)	20 (18)	
Health Workers	16 (46)	9 (26)	3 (9)	2 (6)	5 (14)	
Clinic Staff	29 (47)	5 (8)	15 (24)	5 (8)	8 (13)	
I am able to help my patients quit smoking						.012
Physician	33 (36)	22 (24)	16 (18)	10 (11)	10 (11)	
Nurses	22 (22)	14 (13)	29 (27)	15 (14)	25 (23)	
Health Workers	16 (37)	8 (19)	11 (26)	0	8 (19)	
Clinic Staff	25 (40)	13 (21)	14 (23)	6 (10)	4 (6)	
	Very Important	**Somewhat Important**	**Neutral**	**Somewhat Unimportant**	**Not important**	
Smoking cessation counseling is an important part of a TB program						.0004
Physician	53 (59)	16 (18)	9 (10)	9 10)	3 (3)	
Nurses	40 (37)	16 (15)	24 (22)	13 (12)	15 (14)	
Health Workers	18 (49)	4 (11)	3 (8)	4 (11)	8 (22)	
Clinic Staff	32 (53)	11 (18)	10(17)	6 (10)	1(2)	

TABLE 3.4: PERCEPTIONS OF BARRIERS TO PROVIDING CESSATION INTERVENTIONS FOR TB PATIENTS WHO CURRENTLY SMOKE (%)

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	P value
I am knowledgeable about smoking cessation methods						.001
Physician	48 (55)	12 (14)	14 (16)	6 (7)	7 (8)	
Nurses	28 (26)	16 (15)	24 (22)	16 (15)	23 (21)	
Health Workers	16 (40)	8 (20)	9 (22)	3 (8)	4 (10)	
Clinic Staff	37 (62)	7)12)	9 (15)	1 (2)	6 (10)	
There is enough time during a consultation with a TB patient to discuss smoking behavior and cessation.						.089
Physician	28 (31)	5 (16)	23 (25)	14 (15)	11 (12)	
Nurses	28 (27)	7 (6)	30 (28)	27 (25)	17 (16)	
Health Workers	10 (24)	5 12)	17 (40)	3 (7)	7 (17)	
Clinic Staff	21 (34)	11 (18)	16 (26)	7 (11)	6 (10)	
	Very Interested	**Somewhat Interested**	**Neutral**	**Somewhat Uninterested**	**Not Interested**	
TB patients are interested in quitting smoking						<.000
Physician	25 (27)	13 (14)	31 (34)	17 (19)	4 (4)	
Nurses	56 (53)	10 (9)	16 (15)	9 (8)	15 (14)	
Health Workers	26 (67)	1 (3)	3 (8)	3 (8)	6 (15)	
Clinic Staff	25 (39)	3 (5)	20 (31)	8 (12)	8 (12)	
	Very Successful	**Somewhat Successful**	**Neutral**	**Somewhat Unsuccessful**	**Not successful**	
TB patients would be successful if they tried to quit smoking						.001
Physician	29 (33)	21 (24)	18 (20)	17 (19)	3 (3)	
Nurses	54 (51)	12 (11)	11 (10)	17 (16)	12 (11)	
Health Workers	16 (41)	2 (5)	15 (39)	3 (8)	3 (8)	
Clinic Staff	19 (31)	10 (16)	19 (31)	7 (11)	6 (10)	
	Always	**Frequently**	**Neutral**	**Rarely**	**Never**	
I ask my patients if they smoke cigarettes						.130
Physician	54 (59)	12 (13)	9 (10)	8 (9)	8 (9)	
Nurses	49 (47)	16 (15)	21 (19)	15 (14)	7 (6)	
Health Workers	49 (45)	16 (15)	21 (19)	15 (14)	8 (19)	
Clinic Staff	27 (43)	11 (17)	10 (16)	5 (8)	10 (16)	

Table 3.5: Physicians and Nurses Beliefs of the Effectiveness of Smoking Cessation Treatment Methods (%)

	Very Effective		**Somewhat Effective**		**Neutral**		**Somewhat Ineffective**		**Very Ineffective**		P value
	Physicians	Nurses	Physicians	Nurses	Physician	Nurses	Physicians	Nurses	Physicians	Nurses	
Counseling by a Physician	34 (40)	23 (25)	22(26)	15 (16)	11 (13)	14 (15)	13 (15)	32 (34)	5 (6)	10 (11)	0.012
Group Counseling	41 (46)	22 (23)	30 (34)	20 (21)	11 (12)	20 (21)	6 (7)	18 (19)	1 (1)	14 (15)	<.000
Smoking Quitline	26 (32)	27 (29)	24 (29)	11 (12)	21 (26)	12 (13)	7 (9)	26 (28)	3 (4)	17 (18)	<.000
Medication (nicotine patch, nicotine gum)	12 (14)	24 (26)	17 (20)	16 (17)	17 (20)	11 (12)	9 (11)	22 (23)	29 (35)	21 (22)	0.018

Table 3.6: Health Workers and Non-Clinical Staff Beliefs of the Effectiveness of Smoking Cessation Treatment Methods (%)

	Very Effective		**Somewhat Effective**		**Neutral**		**Somewhat Ineffective**		**Very Ineffective**		P value
	Health Workers	Clinic Staff	Health Workers	Clinic Staff	Health Workers	Clinic Staff	Health Workers	Clinic Staff	Health Workers	Clinic Staff	
Counseling by a Physician	15 (41)	14 (22)	5 (14)	11 (18)	5 (14)	13 (21)	7 (19)	19 (30)	5 (14)	4 (6)	0.205
Group Counseling	12 (34)	26 (42)	7 (20)	17 (27)	6 (17)	11 (18)	2 (6)	3 (5)	8 (23)	3 (5)	0.135
Smoking Quitline	17 (50)	33 (52)	2 (6)	7 (11)	6 (18)	12 (19)	4 (12)	6 (10)	5 (15)	4 (6)	0.699
Medication (nicotine patch, nicotine gum)	14 (37)	18 (29)	8 (21)	4 (6)	6 (16)	9 (14)	3 (8)	11 (17)	7 (18)	20 (32)	0.126

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Chapter 4

Perceived barriers and facilitating factors for smoking cessation among pulmonary TB patients and providers in Pakistan: a qualitative study

Abstract:

Background: Little is known about smoking behaviors and attitudes of TB patients who are smoker in Pakistan, and the opportunities to motivate them to quit and support staying quit during their TB treatment.

Objective: To more deeply explore barriers and facilitating factors to incorporate smoking cessation interventions as part of TB treatment programs.

Methods: Qualitative data on smoking behaviors and attitudes towards smoking cessation were collected through in-depth interviews with seven key stakeholders, and eight focus group discussions (FGD), six FG with a total of 23 male and female TB patients, and two with a total of 14 healthcare professionals, were conducted at DOTS TB clinics in Karachi in April 2011.

Results: Four themes emerged across discussion groups and in-depth interviews:
1) normalized tobacco use, 2) relationship with smoking 3) lack of role models and 4) limited knowledge of the specific harms of smoking.
TB patients described their smoking behavior as part of their daily routine, and a part of socializing. Patients who were smokers had quit because they felt sick when they became ill with TB. They wanted information on how to improve their health, and expected guidance from the physicians and help to stop smoking. Physicians believed their role was primarily to treat the patient for TB. They were aware that a high proportion of male patients were smokers, and said that some patients who smoked asked for advice on how to quit. Patients and providers expressed the belief that patients would start smoking again when their health improved.

Conclusion:

Focus group discussions and in-depth interviews enhanced our understanding of tobacco use

among TB patients, and what may support or hinder smoking cessation in this patient population. We explored the social context of smoking, through dialogues with patients, healthcare providers, and stakeholders, and gained perspectives on the forces that shape opinions and attitudes regarding tobacco smoking and cessation.

Barriers for treating tobacco use in TB patients include: 1) normalized smoking environments, 2) lack of awareness of smoking as a health issue for TB patients, and 3) lack of organizational support.

Facilitating factors for smoking cessation interventions are 1) patient interest in assistance to stop smoking, 2) provider knowledge of cessation methods and the importance of smoking cessation treatment in TB programs

4.2 Introduction:

The majority of the world's 1.3 billion smokers live in low and middle income countries (LMIC) where there is a high burden of tuberculosis (TB) as well.[1,2] By 2030, 10 million people a year will die from tobacco use, and 70% of those deaths be in these LMIC countries.[3] Major causes of smoking-related mortality are atherosclerotic cardiovascular disease, lung cancer, and respiratory disease including tuberculosis (TB).[4] Higher smoking prevalence has been found among TB patients in a number of studies conducted in high TB burden countries, with smoking rates among patients ranging from 20% to 77.6%.[5-7]

Tobacco smoking among TB patients is significantly associated with poor TB treatment outcomes such as treatment default, failure and relapse after treatment, as well as worse clinical outcomes of positive smear readings and delayed sputum smear conversion.[8-11] Retreatment outcomes are often poor, especially in patients with treatment failure or default.[12] Smoking has also been found to be associated with the development of multi-drug resistant (MDR) TB. [13]

Given the high prevalence of smoking among TB patients, there is a critical need for smoking cessation treatments for this high risk patient population. Integration of smoking cessation programs into TB treatment services is strongly recommended.[14]

Pakistan is one of the LMICs' with high TB incidence and rapidly increasing smoking rates. It ranks fifth among the world's 22 high TB burden countries, with 510 new cases of TB per 100,000 people per year.[15] Overall tobacco smoking prevalence among adults is 19%, with 22% of adult males' being daily, current smokers.[16] The poor and uneducated are at increased risk for both TB and tobacco use in Pakistan.[17,18]

Studies on tobacco use in Pakistan have described characteristics of smokers and prevailing socio-economic predictors of smoking behavior such as age, gender, education, and income. [19-21] However, there is little research on smoking cessation and effective cessation interventions. As in in most developing countries, tobacco addiction treatment interventions have not been developed for the general population in Pakistan.[22] As such, there is limited evidence upon which to develop effective strategies to promote uptake of smoking cessation services and promote quitting among TB patients.

Qualitative research is an approach used to improve understanding of social norms and personal influences related to tobacco smoking and preferences for quitting.[23] Sensitive to the unique personal experiences, perceptions, beliefs, and meanings related to individuals, qualitative methods can highlight what hinders and helps TB patients who are smokers to quit and stay quit.[23] Qualitative research on barriers and facilitating factors for smoking cessation among disadvantaged groups in high income countries has found living in stressful environments, lack of financial resources, and perceptions of smoking in the community, to maintain smoking behavior. A key factor for stopping smoking was concerns about health, and a desire to improve health and improve smoking related illnesses.[24-27]

To support behavioral change in TB patients who are smokers in a TB treatment setting in Pakistan, describing the perceptions and attitudes towards smoking, quitting, and methods for quitting, of both TB patients and healthcare providers, is essential.

4.3 Methods

4.3.1 Study Design:

Focus groups and in-depth individual interviews were conducted to help identify beliefs,

attitudes, and knowledge regarding smoking and cessation treatment, and perceived barriers toward providing smoking cessation. Interview guides were used to provide consistency across focus group discussions and individual interviews.

In April and May, 2011, patient and provider focus group participants were recruited from three TB clinics, the Institute of Chest Diseases, Kotri and Indus Hospital TB clinic, in Karachi, Pakistan. To obtain the maximum level of exploratory data through full involvement of respondents, the study utilized a small group design, with five to eight members per group.[28] Selection of sample sizes in qualitative research is based on the need to understand a phenomenon in depth, rather than producing broad generalizations. We believe that our group sample size provided information to the point of redundancy of ideas.

4.3.2. Setting and Participants:

For TB patients, we conveniently selected patients who were attending the three outpatient clinics, at the Institute of Chest Diseases, Kotri , Indus Hospital TB clinic, and Sind Government Hospital TB Clinic, Karachi. Eligible patients were age 18 or older, and were either being screened for TB, or were registered and being treated at the clinic. We attempted to bring together patients of similar social and demographic characteristics as much as possible, to facilitate discussion.

A total of six patient focus groups were conducted, three groups with males, including current smokers and former smokers, and three groups with females. At each clinic site, we held two patient focus groups, consisting of 5-8 patients currently being seen at the TB clinic, grouped by sex. Participants comprised 18 women, ranging in age from 18-50 years, and 21 males, age range 18-62 years.

Two provider focus groups were conducted, one at the Institute of Chest Diseases, Kotri and one at Indus Hospital TB clinic, Karachi. Each group consisted of 5-7 health care professionals (clinicians, nurses, treatment facilitators and support staff) who were currently involved in TB patient care and available to participate.

A qualitative case study [29,30] approach was used to gain in-depth perspective on health policy makers and TB program managers opinions of integrating tobacco control interventions at the individual level in TB treatment settings. In-depth interviews were conducted with selected officials in executive or leading positions for TB and tobacco control in Pakistan. The purposive sample consisted of representatives from the national TB Control Program managers, TB clinic directors as well as officials from the Pakistan Tobacco Control program and USAID and WHO country officers. The key stakeholders were selected on the basis of their 1) knowledge of TB and tobacco related health issues in Pakistan; 2) role in decision making in health policy and programs in Pakistan and 3) current involvement in Pakistan's TB and tobacco control programs.

4.3.3. Data Collection:

Focus group discussions were conducted by two team members, a trained facilitator and a note-taker. Discussions were conducted in Urdu, with the facilitator using separate semi-structured guides for the clinician and patient focus groups. The guides included open ended questions on smoking behavior, awareness of health effects of tobacco on lung health/TB, knowledge and awareness of tobacco laws, motivation to quit and attributes of effective smoking cessation interventions. Provider focus groups included discussion of resources currently available/not available to include smoking cessation efforts into TB treatment centers as well as constraints and opportunities to provide cessation advice to patients. Topic guides were developed based on

qualitative research on cessation counseling and treatment among physician and patient populations.[31-39]

At the beginning of each focus group, the facilitator explained the research study purpose, methods used to document the session, and the voluntary participation of the patients. Oral informed consent was obtained from participants. Following patient group discussions, participants were provided 100 Pakistan rupees ($1.00 USD).

Group discussions lasted approximately one hour and were audio recorded with the participants' permission. Because the discussions were intended to be free flowing, not every participant answered every question. Findings from earlier groups were iteratively used with subsequent ones to evaluate saturation or disconfirmation of emergent themes. [40,41]

Key stakeholders were interviewed once, in approximately a one-hour session. Discussion topics for interviews included: knowledge and perceptions about the DOTS strategy, success and challenges for TB control faced in Pakistan, awareness of tobacco use as a public health problem; issues in tobacco and TB control efforts; personal perceptions of and beliefs about tobacco use among professionals; knowledge of health effects of tobacco on lung health/TB; attributes of a successful smoking cessation intervention; and obstacles faced in implementing smoking cessation policies. Interviews were conducted in English by the researcher. Each interview was considered a separate case, and then compared with other cases to identify divergence in responses.

4.3.4. Analysis: Data were collected and analyzed using a grounded theory approach.[42] The term grounded theory reflects the concept that the theory emerging from this kind of research is grounded in the data.[43] The focus is on identification, description, and explanation of the

interactional process between and among individuals or groups, within the context of smoking behavior and cessation.[44, 45]

All focus group discussions and in-depth interviews were audio-recorded, and professionally transcribed. Patient and provider FGD were translated into English. In-depth interviews were conducted in English. Transcripts were reviewed and coded by the researcher according to initial themes covered by the guiding questions, to identify recurring themes, concepts and terms that are relevant to characterizing the pattern of tobacco use and smoking cessation. Findings from earlier groups were iteratively used with subsequent ones to evaluate saturation or disconfirmation of emergent themes. Representative quotes were selected to illustrate findings.

4.4 Results

4.4.1 Patient Focus Group Discussions

Table 1 describes the focus groups participants by age and sex.

Smoking Behavior

Among eighteen female participants, none stated they were current or recent cigarette smokers, and few were aware of laws prohibiting smoking in public place or of anti-smoking images on cigarette packs. A few women said that older women in their homes, their mother or mother-in-law, smoked bidis (hand rolled tobacco in betel leaf) or smoked hookah.

"My mother- in- law smokes bidis, not cigarettes. She smokes four or five bidis, a day, usually after breakfast then after meals."

Among the twenty one male patients, sixteen said they were smokers, 9 current smokers and 7 former smokers. Patterns of tobacco use described by male patients were of light, intermittent smoking, of smoking with meals, and in social settings with their friends. Some of the patients who smoked said they smoked because of tension and stress, others for enjoyment. The cost of cigarettes was said to be two Pakistani rupees a cigarette, and patients said they smoked between 7 -15 cigarettes a day.

" I smoke, but not regularly"

" I do smoke. I wake up, have my breakfast and a glass of water, after that I smoke. I smoke again after one and a half hours, then I keep smoking every 1-2 hours. I smoke 8- 10 cigarettes in a day."

"I just keep cigarettes with me for the contentment of my heart. I wake up at morning and smoke after having breakfast. I smoke 1-2 cigarettes at that time. Previously I used to smoke a lot. Used to smoke 15-20 cigarettes in a day."

Patients perceived tobacco use as a common occurrence in their community, as they went about their daily activities, traveling by public transportation and in markets, at shops, businesses.

"You have to come and go in this world. On the bus there is always people smoking. I get angry, but you can't make anyone stop (smoking)."

"Smoking is prohibited in public areas and parks, but still people smoke there and no one can stop them."

Patients, especially the females, reported that since they became sick with TB, being around smoking bothered them – "if someone is smoking near me it irritates me so much that I feel like

killing the smoker." "I tell my husband not to smoke as I don't like the smell. He leaves the room but still does smoke."

Men and women said that male relatives in their homes smoked, as well as the male guests who came to their home. "My relatives visit every day, and they smoke in our house when they come over". Most of the male patients said their father, brothers, uncles, were smokers. "My elder brother used to smoke, we advised him to quit, he did quit but started naswar (chewing tobacco) then switched to bidi."

All the FG participants believed smoking was increasing in Pakistan. "Before, one out of twenty people used to smoke, but now every other person smokes." Participants felt that more young people were smoking, and smoking was common among men and women. "Mostly people start smoking at younger ages, now kids start smoking as young as seven and eight", "even women are smoking cigarettes!", "females are adopting what males have quit."

Male patients were more aware than female patients there were smoking laws, but said they were not enforced – "It is forbidden to smoke in some areas but some people don't respect the rules." When the moderator stated that smoking is not allowed in hospitals, people cannot smoke here, a patient laughed and said "Those are the innocent people."

"On the cigarette packs, it says smoking is dangerous for your health, but it doesn't make a difference."

"If that was true, why doesn't the Government of Pakistan ban it, people smoke because it is available everywhere."

Patients, smokers and non-smokers, described smoking as woven into the routine and social aspects of everyday life, but viewed smoking as an addiction. "We do realize smoking is not a

good thing. When we are out in a gathering with friends and any of us do this, we feel that now we are taking it for fun but it is too infectious and might become an addiction later, which is not easy to quit."

"My father smokes too much, I'm not sure but maybe 4-5 packs day. Like some people can't live without hashish, he can't live without cigarettes."

Almost all participants, male and female, described daily use of some form of smokeless tobacco- paan (betel leaf with tobacco paste), naswar (powdered tobacco mixture for chewing), gutka and mainpuri (which contain tobacco, areca nut and lime as their main ingredients).

Knowledge about TB and the harm of smoking

Patients did not know that they were sick with TB, or how they became infected. Almost every patient said they had one or more family members who were either sick with TB or had recently died from TB. Many patients described considerable delay between the onset of symptoms and TB treatment. They went to various health providers, to seek treatment for cough or fever, before they were diagnosed at the government TB clinic and given appropriate TB medications.

"I had no idea I could be suffering from this disease then I had fever for 15 days. I went here and there for the check-up then someone suggested I get myself tested. Today is my first day here."

"Earlier I was visiting a doctor who owns a small clinic in our neighborhood but the medicine he prescribed was not working, then someone told me about this hospital. Here I came to know I had TB."

"I had a serious cough then and I was looking at different places for a cure but in vain. Now it

has been one and a half months since I came to this hospital I have recovered so much in a very short time."

Patients believed that TB could be treated with medication "of course it is curable now, though it wasn't earlier", but also wanted information from physicians about what else they should do for their health. An older male patient, who had quit smoking, asked "My question is how would I heal from this disease completely, I did a nine month course I recovered but it attacked me again."

Patients believed that smoking was bad for their health. "It (smoking) doesn't seem hazardous but it keeps killing you from the inside, and it's too late when you get aware of the damage, even quitting doesn't help."

"It is not only dangerous for the one smoking, but also for the ones sitting around."

Reason for quitting smoking

Most patients who reduced or quit smoking had done so because of their TB illness. Patients who were smokers said they had not considered quitting smoking before they became sick – "my family asked me to stop, but when I go out with my friends, I smoke with them." "Our mothers ask us to quit and threaten us, but we know they are not going to do anything. We make them believe we have quit but as soon as we are out of the home, we are back to smoking."

"You don't think of the bad effects of smoking, but when you get sick you don't feel like smoking."

"Never thought of it (quitting) before, but when I fell ill and went to the doctor, and he asked about smoking and said to stop smoking, then I realized it."

“I used to smoke a lot but then felt so ill so I quit it and started taking naswar (chewing tobacco).”

“ I have almost left smoking now. Hardly smoke one or two cigarettes in day. It isn’t easy to quit all of a sudden, especially when you had been smoking since long – but I try to pause smoking for as long as I can.”

“ I didn’t quit, but I have reduced it. I smoke hardly once or twice in a day, but do use naswar when with my friends. I mostly smoke at morning when I wake up, and then at night before sleeping.”

Role of doctors and smoking cessation methods

Patients believed that doctors “should teach/guide people on health issues.” “Doctors are the caretakers of our health, our health belongs to them.” When asked what would be helpful for patients trying to quit smoking, patients said they believed what doctors tell them. “What a doctor tells you about the TB medicine (effects) is correct, so what they say about smoking is true.” “Doctors should guide us at every visit.”

The women patients said that physicians did not ask them about smoking – “Doctors don’t show much interest”, “You are the first (doctor) to ask if I smoke.” “Doctors should tell my dad that his daughter is suffering with this disease and if he smokes she will suffer more. Being a father, he would be concerned about me and will try not to smoke in front of me.”

Patients believed that smokers could quit smoking through will power. They were not aware of medication to help them stop smoking, or of a cessation helpline number to call.

"A person who is determined to quit does not need any medicine or advice."

"It is twelve years since I quit, all you need to do is say goodbye and never touch it again."

"I was too much into smoking but then I decided to quit it. I threw the cigarettes and never touched them again."

The male patients said doctors only asked about their smoking at their TB first visit, when they were diagnosed with TB and started on TB treatment. "Doctors tell us that smoking is bad for our health." "They don't ask us questions about our smoking, but they tell us not to smoke." Some male patients said they were truthful when asked about smoking, and even asked the physician how to quit smoking, but others said they didn't tell the TB physicians about their smoking.

Male patients who were smokers said they had quit when they felt really ill, but believed would start again once they began to feel better. "We do feel convinced here (at the clinic) and start thinking the doctor has given useful advice. But as soon as we leave, and a few hours are passed, we forget about it and go to buy cigarettes."

Patients felt that counseling by a health care provider or group counseling could help them quit, "If someone talked to me every day then I would quit." "I think you should take the help of those who have successfully quit or are trying to so. These are people who can better understand and motivate smokers to quit." Most patients did not feel they would be able to come to the clinic for smoking counseling. No participants reported knowing about or using smoking cessation medications. Former smokers who had quit said they had used smokeless tobacco products as a replacement for smoking.

4.4.2 TB Provider Focus Group Discussions Results:

Physician Beliefs about Smoking –

None of the 12 TB clinic health care providers in the two focus groups reported smoking. Providers, like patients, believed smoking was increasing in Pakistan, especially among young men. They were more aware of laws prohibiting smoking in hospital, public areas, but also said that anti-smoking laws were not enforced. Physicians said that many of the male TB patients were smokers, but not all patients discussed their smoking with the doctor. "Definitely, many of the patients, especially males, are smokers, but because they are afraid or scared they don't tell us the truth that they smoke". Providers also believed that many health professionals were smokers. "Lots of doctors smoke, many doctors! The head of the National TB Program isn't any different."

Physicians felt patients smoked as a form of relaxation, a habit, a social activity, because it was fashionable, even as a digestion aid. While all the physicians said smoking was harmful to health, some said they did not feel it to be more harmful for TB patients specifically. "Tobacco use is an important factor, but it is not necessary that a smoker will get TB, or because of smoking will spread TB." But providers believed that smokers took longer to seek medical care and get a TB diagnosis. "A sick person who smokes takes long to get medical care because he thinks smoking is causing his cough."

Physician's role in helping patients quit smoking

In the discussions with providers, smoking treatment was not considered an urgent issue to address with their patients. Providers felt their first responsibility was to respond to the patient's

medical complaints, that their priority was providing TB care. As part of taking a new patients medical history, physicians would ask if the patient smoked. They did not ask patients at follow up visits, or address how to quit smoking with smokers. As part of the assessment at diagnosis, physicians would ask if they used drugs, or addictive substances. If a patient reported smoking, they would counsel them to quit smoking as they would for patients who used drugs.

Providers felt patients were not honest with them about their smoking. Even if patients stopped smoking initially, because they felt sick and could not breathe, physicians said they would begin smoking again as soon as they felt better after starting TB treatment. Providers felt that patients knew of the harm to their health from smoking. Those patients who did ask about how to quit smoking, were told reduce the number of cigarettes, or to use some form of smokeless tobacco instead. and to have will power to quit. Physicians said that patients who were determined to quit would follow their advice, and quit smoking.

Attitudes to providing smoking cessation treatment in TB treatment

Health providers were pessimistic about TB patients being able to quit just by being told to quit. They felt stopping smoking depended on the patient's willingness to quit and willpower. "All I know is, it just depends on your will. If you are willing to quit, you will." Providers felt due to the number of patients they see each day, it would not be possible to spend additional time with a patient for smoking counseling. "It is not possible because of the work load. It is not possible to give an extra five minutes to each patients." Physicians felt that smoking cessation counseling should be done by a counselor, "who could discuss in detail about the hazards and side effects of smoking."

4.4.3 Qualitative In-depth Interviews

Table 2 lists the questions for the stakeholder interviews.

We conducted seven interviews with key stakeholder. All respondents felt smoking was a public health issue in Pakistan. But all stakeholders stated that improving the health of the population through tobacco control efforts was not a priority for the government of Pakistan. Each individual commented on the lack of implementation of national tobacco control regulations, on the high rates of smoking among the general population, and among government officials and health care professionals, and the large role of the tobacco industry in Pakistan.

"People don't know the gravity of the health hazards of smoking. They perceive it as a minor problem."

"Smoking is not a priority among policy makers. There is no planning for health of the population, only 1.7% of the budget is for health."

"We have the laws. But the single most important thing (for tobacco control) that is lacking in Pakistan is the implementation of the law."

"I have met many doctors who are smokers. How can we convince a doctor who is smoking, he won't tell his patients not to smoke."

Tobacco control in Pakistan

Stakeholders discussed efforts that had been made in Pakistan, and the various regulatory ordinances that were in place, such as Prohibition of Smoking in Enclosed Places and Protection of Non-smokers Health, and the Cigarette (Printing of Warning) Ordinance. A stakeholder

mentioned that legislation had been passed preventing tobacco companies from selling "small packs" – packs of cigarettes with five or fewer cigarettes.

"Pakistan is leading in tobacco control legislation in this part of the world."

"Tobacco control efforts are improving. But tobacco control is not a priority in our country. We see our president, our ministers smoking on television all the time." "Pakistan government is addicted to tobacco industry money. It generates about 60 billion rupees a year from tobacco industry. There is a fear if they do something against them this revenue will go down."
"Government secretaries who retire join the boards of the tobacco industry."

Stakeholders highlighted the need for health education for the general public and health professionals on the harms of smoking, of increasing awareness of the dangers of smoking through media, and enforcement of anti-smoking regulations.

TB control in Pakistan

TB control was considered to have significantly improved in Pakistan since the implementation of the DOTS program in Pakistan. However, lack of trained health care staff for government clinics, lack of TB treatment facilities in rural areas, limited funding, and weak coordination with private sector providers, were seen as factors limiting TB control efforts. Donor agencies agendas were seen as both strengthening and restricting control efforts.
"TB control is better than before, at every level, but we can't stop TB with the current methods."
"Majority of TB patients first go to private health providers, who are not trained in diagnosing or treating TB."

"TB patients are very poor, it is difficult to get them to DOTS treatment as they lack money to get to the clinic" "To improve TB treatment efforts, we have to increase social support for TB patients, and give economic support."

Tobacco use and cessation intervention

While stakeholder noted that many patients were smokers, the focus of their concerns was on diagnosis and treatment of individuals with TB.

"TB is the priority, first to find, diagnose, treat. Smoking is a secondary concern."

"Smoking is a problem, it causes other diseases like cancer, COPD, but you can take care of smoking later, after you have treated the patient."

"It is very difficult to talk to patients about smoking. No one is going to quit smoking because you tell them to."

But even as they expressed uncertainty about the relationship between smoking and TB, stakeholders believed that smoking treatment for TB patients could be provided with TB treatment.

"There is not an established association between TB and smoking, but it is a good idea to include smoking treatment with TB treatment."

"Tobacco control is a natural fit with TB control efforts." "Patients have to come to clinic at least four times during TB treatment, it is a fairly good opportunity to provide cessation treatment."

"Smoking cessation training can be included in the NTP TB training modules. All DOTS providers have to attend the TB training sessions."

Support for smoking cessation

Stakeholders believed that prevention and treatment of smoking, for the general public or TB patients, was not a government priority. They felt the provision of cessation interventions for TB patients needed to be mandated by international agencies such as WHO, and the National TB Program.

"The government decides national policy, but needs evidence and information. If it is the policy of the NTP, it should be sufficient."

"WHO provides leadership to the NTP, if WHO says to include smoking training, then it will happen."

4.5 Discussion:

In discussions with TB patients we found that most patients who were smokers had quit because of being sick with TB. Patients were anxious about their illness, and wanted information on how to improve their health and were receptive to advice about quitting smoking. They expected their physician to tell them about the harms of smoking. While physicians believed their role was to treat the patient for TB, patients also wanted more guidance from the physicians on improving their health and how to stop smoking. Patients and providers were concerned that those (patients)

who stopped smoking would begin smoking again when their health improved. Stakeholder concerns were

Four themes emerged across discussion groups and in-depth interviews: 1) normalized tobacco use, 2) relationship with smoking 3) lack of role models and 4) limited knowledge of the specific harms of smoking.

Smoking behavior was seen as being deeply embedded in the daily lives of all the participants. People mentioned how they routinely mixed with smokers, in their home, at stores, at work, in parks, on public transportation, there were always people who were smoking. Smoking restrictions, to protect non-smokers and reduce the acceptability of smoking, were seen as not being enforced and perceived as not meaningful. Another form of normalization of tobacco use was the low cost of cigarettes, and the ability of the patients to purchase them easily in the quantity they wanted (ie one or two loose cigarettes or small packs of five cigarettes).

Individuals referred to a relationship with cigarettes, a closeness of the person's association with cigarettes.[46] Smokers and non-smokers viewed smoking as a form of stress relief, as well as a source of pleasure. Patients who were smokers described smoking when they were alone, for relaxation. Smoking was also used as an acceptable part of socializing, of forming bonds with friends and relatives who also smoked. Many smokers described favorite cigarettes, with their breakfast or with tea after work, the "routine" of smoking.

Patients, providers, and stakeholders believed that there were high levels of smoking among healthcare professionals. Physicians are often viewed as role models and expected to be aware of the consequences of smoking. These expectations of physicians as roles models influences support for tobacco control messages.[47] The awareness of smoking behavior among health professionals in our study, by patients and health care providers, seemed to downplay the

hazards of smoking, the need for smoking cessation for patients, and undermined confidence in physician advice to quit smoking.

While smoking was perceived as being harmful, by patients, providers, and stakeholders, absolute awareness of the health risks of smoking were not expressed. Smoking harm was stated as "smoking is bad for you" by patients, but not in terms of specific diseases or functional impairment. Health care providers and stakeholders mentioned increased risk of lung cancer, head and mouth cancers, and respiratory diseases such as COPD, but the risks of smoking to patients with active pulmonary tuberculosis were not well known. Patients sought deeper understanding of the effects of smoking on their illness, to improve their health. Physicians viewed TB treatment as a more urgent competing priority.

Our findings are similar to what has been described in other qualitative research that examined the social context of smoking among specific populations with lower income and education levels. Like the patients in our study, people in low income groups that were studied were more likely to smoke, suffer a disproportionate amount from smoking-caused disease, and also have low rates of quitting.50 And, as in our study, high prevalence and acceptability of smoking in the community and among family and friends was a characteristic of low income populations.51 Tobacco was readily available and easily accessible, and smoking behavior was considered highly acceptable.52 Reasons for smoking behavior as described by patients in our study are similar to those described in the other qualitative studies: smoking for stress management, enjoyment of smoking, habit, and smoking cultural norms.53, 54 A lack of support to quit smoking from health professionals was also identified among the groups in other studies. 55 Our study findings for lack of support were in patient and provider comments that tobacco use among

patients was only addressed at the first TB visit, and by awareness that many health professionals and program managers were smoker.

This qualitative study contributes to understanding implementation of smoking cessation interventions in DOTS TB treatment facilities in Pakistan. We identify some factors that may play a role in implementation of cessation treatment.

The WHO Social Determinants of Health framework [48] emphasizes looking at "up-stream" causal factors associated with smoking, such as socio-economic context and differential exposures to smoking cues, as well as more proximal cues, to understand the social and environmental factors that create unequal distributions of risk factors and disease. To gain insight into the mechanisms that create differential rates of tobacco use and utilization of cessation treatment among pulmonary TB patients in Pakistan, we explored the beliefs and attitudes of TB patients who smoke and the health care providers who treat their TB disease. Through FGD and interviews, we examined the social context [49] that influences smoking behavior and may be a barrier to cessation treatments, that is, "the circumstance or events that form the environment within which something exists or takes place as that which therefore helps make phenomena intelligible and meaningful"[49] Some aspects of social context explored in our qualitative study were capacity to act, the physicality and social association of smoking, desire or pleasure associated with smoking, role of place in smoking, and patterns of smoking consumption.[49]

An important limitation of our qualitative research is that no inference can be made about the prevalence of these beliefs and attitudes in the larger population of TB patients, healthcare providers, or key TB officials. Observing the number or variety of emergent themes which support smoking behavior or cessation is not equivalent to quantifying their effects on participants and may represent an oversimplification of the issue.

And, given the interpretative nature of the qualitative approach, the researcher's own interpretations play an important role in the study. However, an examination of other qualitative studies conducted among disadvantaged populations provided some comparisons of study findings.

This study is exploratory and describes experiences in Pakistan only, but our findings may apply to other high TB burden, low resources countries and TB patient populations. Further qualitative research is needed, in other countries as well as in Pakistan, on the perceptions and attitudes of TB patients and health professionals, to permit a more comprehensive understanding of tobacco use among TB patients and how the TB treatment setting can intervene to modify smoking behavior.

On the basis of this study's results, smoking cessation interventions for TB patients in Pakistan will need to address wider social and cultural factors to provide effective individual smoking cessation support. Our work has identified some factors that can be modified in the TB clinic setting, to assist in the successful uptake of cessation treatments in TB treatment clinics in Pakistan. These include making TB clinics smoke free, to de-normalize smoking; assessing tobacco smoking and offering cessation advice and treatment at time of TB diagnosis to all patients, men and women; integrating information on negative effects of smoking on TB with TB treatment counseling; and providing cessation support for patients who are smokers during the entire course of their TB treatment.

Table 4.1 Focus Group Participant Characteristics			
	Male	**Female**	**Age, years Median (IQR)**
Patient focus group 1	7		28 (25– 41)
Patient focus group 2	6		45 (29 53)
Patient focus group 3	8		25 (24.5 – 30)
Patient focus group 4		6	25.5 (24– 29)
Patient focus group 5		5	27 (21 – 40)
Patient focus group 6		7	35 (21.5 – 40)
Provider focus group 1	5	2	
Provider focus group 2	7		

Table 4.2: Interview questions for stakeholders
1) What is the current state of tobacco and TB control efforts in Pakistan? What factors limit your efforts? What support would improve TB treatment outcomes?
2) Do you feel tobacco use is public health issue in Pakistan? In TB disease and treatment outcomes?
3) Do you think there is a need of any kind of smoking cessation intervention to reduce tobacco use and improve public health in Pakistan?
4) Are there priority groups for these interventions?
5) What kind of cessation interventions do you think would be effective in Pakistan? Who should be responsible for incorporating interventions?
6) (At Institution /govt level) Who should finance smoking cessation interventions for TB patients?
7) Is there any budget for tobacco control? If yes, how much is spent/yearly for smoking cessation in TB treatment?

4.6 References

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CHAPTER 5

Summary of Study Findings and Public Health Implications

5.1 Summary Introduction

In 2003 WHO proposed a framework for treatment of tobacco use, and in 2007 the International Union against Tuberculosis and Lung Diseases called for inclusion of brief smoking cessation advice in standard TB case management. [1,2] Smokers are at increased risk for developing TB, present with more severe active TB disease, have lower sputum conversion rates and so are infectious longer, and are more likely to have poor TB treatment outcomes, including treatment failure, reinfection with TB, and death. [3-9] However, no country has yet implemented a national strategy for tobacco control among TB patients. Smoking cessation is generally not offered as part of standard TB care, and not integrated within TB programs even in countries with high TB incidence and high tobacco use.

Tobacco control and smoking cessation for people afflicted with TB can play an important role in limiting the burden of TB. Our research in Pakistan, examining tobacco use and cessation among TB patients, highlights some factors for integrating TB and tobacco treatment.

5.1.1. Chapter 2: Prevalence of and Risk Factors for Cigarette Smoking Among Pulmonary TB Patients in Karachi, Pakistan.

In an observational, cross sectional study of 963 adult TB patients, we found 14 % of patients, and almost a quarter of male patients (22.7%) were smoking within 3 months of TB diagnosis. Smokers stop smoking when symptoms of TB occur, so we assessed smoking at time of diagnosis and within 3 months of TB diagnosis. Smoking was associated with age, male gender, and alcohol use. Assessment of smoking among TB patients when they are diagnosed should include tobacco smoking at time when TB symptoms began.

5.1.2. Chapter 3: Smoking Behavior, Knowledge and Attitudes Towards Smoking Cessation: A Cross-Sectional Survey of TB Healthcare Providers in Karachi, Pakistan

In this cross-sectional study, we surveyed TB health professionals' attitudes and knowledge of tobacco use and cessation treatment. Among 313 healthcare providers (physicians, nurses, health workers, and clinic staff) there was limited knowledge of the hazards of smoking on TB disease, and mixed attitudes towards TB patients' interest in or ability to quit smoking. Fewer physicians believed patients wanted to quit smoking, though the majority of physicians said they always asked their patients about smoking, and

believed they were knowledgeable about smoking cessation methods. Most TB providers believed that smoking cessation should be offered in TB treatment programs. However, most also believed there was not enough time during a patient visit for cessation counseling.

5.1.3. Chapter 4: Perceived Barriers and Facilitating Factors for Smoking Cessation Among Pulmonary TB Patients and Providers in Pakistan: A Qualitative Study

In this qualitative study, focus group discussions were held with TB patients and providers, and in-depth interviews were conducted with key stakeholders who were part of TB and tobacco control efforts. Male patients who were smokers talked about reducing or quitting smoking as they became sick with TB, and that they were interested in quitting. But they believed they would begin smoking again when their health improved with TB treatment. Providers felt their priority was treating TB, though they believed many of their male patients were smokers. They said they had too many patients to see each day, that there was not enough time for cessation counseling. Stakeholders said smoking cessation was not a priority for government health programs, that tobacco control legislation had been already passed even though poorly implemented.

Normalization of smoking in the social culture, with community acceptance and tolerance for smoking, especially among males, and lack of support for quitting were among the themes that emerged in discussions with patients, providers and key stakeholders.

5.2 Limitations: Our descriptive study was conducted with convenience samples of patients and health care providers, which may have impacted our findings. An important limitation of our qualitative research is that no inference can be made about the prevalence of these beliefs and attitudes in the larger population of TB patients, healthcare providers, or key TB officials.

5.3 Strengths: Our study is an example of locally relevant operational research. Our findings contribute to understanding tobacco use among TB patients, TB providers smoking cessation practices, and the role of the social environment on patients and providers. We conducted our study in partnership with the Pakistan National Tuberculosis Control Program and a local research organization, and our finding may serve as a source for future research on developing smoking cessation interventions for TB patients.

5.4. Public Health Relevance

Our results contribute to the sparse research literature in Pakistan on tobacco smoking and cessation treatment among pulmonary TB patients.

Tobacco use is the world's leading avoidable cause of preventable death today [10], and the global burden of tobacco use is only increasing, especially in LMIC. Most of these countries, with high TB and tobacco use burden, have implemented population based tobacco control measures such as increased tobacco taxation, bans on advertising, pictorial or graphical warnings on package labels, smoke-free legislation, and restricted sales to minors. But lack of implementation of these strategies creates a culture where tobacco use is acceptable, and the health risks of tobacco use are not well known.[11]

People who choose to smoke are influenced by the environment where they live. For TB patients who are smokers in Pakistan, or anywhere tobacco products are easily accessible and social norms support smoking, it may be difficult to quit smoking. Our study found tobacco smoking was common among TB patients in Pakistan, with a high prevalence among male patients. Patients had quit or reduced smoking when TB symptoms developed, and were interested in cessation counseling at TB diagnosis, a "teachable moment". But health care providers failed to assess patient smoking during the six months of TB treatment, or provide effective cessation strategies. Health providers' lack of knowledge of the association between smoking and TB may have impacted their willingness to address smoking cessation in patient interactions. And a common perception of all study participants - patients, health care providers and

stakeholders – was that smoking was an acceptable, common behavior, whose impact on patient health could be addressed after TB treatment. Such thinking may have also contributed to the failure of health care professionals, in a treatment setting, to not treat tobacco smoking in a respiratory disease patient population .

Healthcare professionals are expected to assess patient smoking at every health related interaction, and recommend strategies to quit to smokers. Patients who are being treated for an illness are receptive to physician advice to stop smoking. [12] To change the cultural environment that supports smoking behavior, social role models such as health professionals will have to stop smoking, and social leaders will need to advocate for the development and implementation of smoking cessation interventions. To incorporate knowledge of smoking hazards among health professionals, medical schools will need to teach about the health risks of smoking and the effect of smoking on disease. Health care programs will need to broaden, to address the multiple health needs of patient populations. National policy will need to be formulated that, through enforcement of anti -smoking regulations, de-normalizes smoking in the society.

All of this will take time.

Smoking cessation treatment must be a routine part of clinical care of a respiratory disease. Small increases in tobacco cessation can have an important public health impact. Currently available, shown to be effective strategies for smoking cessation, should be employed in TB health care settings. National TB control programs must mandate smoking cessation counseling, even if just brief advice, be provided to every patient at every opportunity by all providers. Training on the hazards of smoking, the benefits of smoking cessation, and simple cessation strategies, should be part of DOTS training modules. Reducing the burden of TB disease in Pakistan is a public health priority.

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APPENDIX

SMOKING AND TB SURVEY

Date Interview Started (MM/DD/YY): __ __/__ __/__ __

Time Interview Started (24 hour time): __ __:__ __

(HRS : MIN)

Clinic Name: _____

A. BACKGROUND CHARACTERISTICS

Intro: I am going to ask you a few questions about your background.

A1. When were you were you most recently diagnosed with TB?

Day: ☐☐

Month: ☐☐

Year: ☐☐☐☐ Interviewer: If more than two months ago end interview- allow for leeway

A2. Interviewer: Record gender from observation. Ask if necessary

Male…….. ☐
Female… ☐

A3. How old are you?

Interviewer: If respondent is unsure, probe for an estimate and record answer

☐☐☐ Years old

Interviewer: If respondent is < 18 years of age END INTERVIEW

A4. How many years of school have you completed?

☐☐ Years of school completed

No Formal Schooling…… 1

Don't Know…….. 77

A5. What is your total family income per month? (In Pakistan Rupees)

Interviewer: If respondent is unsure, probe for an estimate and record answer

0-4999 ..... ☐ 1

5000-9999 ..... ☐ 2

10000-14999..... ☐ 3

15000-19999..... ☐ 4

20000 or more ..... ☐ 5

A6. Please tell me whether you or any person who lives with you has the following items:

		Yes	No	Don't Know
READ EACH ITEM:				
a.	Electricity?.....	1……	2……	7
b.	Flush toilet?.....	1……	……	7 7
c.	Fixed telephone?.....	1……	……	7
d.	Cell telephone?.....	1……	……	7
e.	Television?.....	1……	……	7
f.	Radio?.....	1……	……	7
g.	Refrigerator?.....	1……	……	7
h.	Car?.....	1……	……	7
i.	Moped/scooter/motorcycle?.....	1……	……	7
j.	Washing Machine?.....	1……	……	7

A7. What type of fuel does your household mainly use for cooking?

No cooking done ..... ☐ 00

Electricity ..... ☐ 1

Compressed natural gas(CNG)..... ☐ 2

Kerosene..... ☐ 3

Charcoal ..... ☐ 4

Wood..... ☐ 5

Wood shavings/rice husks/straw ..... ☐ 6

Other..... ☐ 7

→ Specify type:_____

A8. Is the cooking usually done ….

In the house ..... ☐ 1

In a separate building ..... ☐ 2

Outdoors..... ☐ 3

Other..... ☐ 4

→ Specify type:_____

B. TOBACCO SMOKING

Have you ever smoked cigarettes, even just a puff?

Yes ☐ 1

No ☐ 2 Skip to C1

Have you smoked more than 100 cigarettes ever in your lifetime?

Yes ☐ 1

No ☐ 2 Skip to C1

B1. Do you <u>currently</u> smoke tobacco on a daily basis, less than daily, or not at all?

DAILY..... ….. ☐ 1 → SKIP TO B3

LESS THAN DAILY..... ….. ☐ 2 → SKIP TO B3

NOT AT ALL ..... ….. ☐ 3

[DON'T KNOW]..... ….. ☐ 7

B2. In the past, have you smoked tobacco on a daily basis, less than daily, or not at all?

INTERVIEWER: IF RESPONDENT HAS DONE BOTH "DAILY" AND "LESS THAN

DAILY" IN THE PAST, CHECK "DAILY"

DAILY ..... …… ☐ 1 → FORMER SMOKER Skip to B6

LESS THAN DAILY ..... …… ☐ 2 → FORMER SMOKER Skip to B6

NOT AT ALL ..... …… ☐ 3 → Skip to C1

[DON'T KNOW] ..... …… ☐ 7 → Skip to B6

B3. When was the last time you smoked any tobacco products?

ENTER UNIT AND NUMBER

B3a WEEKS…….. ☐☐☐

B3b DAYS…….. ☐☐☐

B3c HOURS ……..…..

B3d MINUTES…….. ☐☐☐

B4. On average, how many of the following products do you currently smoke each (day/week)? Also, let me know if you smoke the product, but not every (day/week).

INTERVIEWER: ASK STEM QUESTION IN B4 AND EACH ITEM PART (A THROUGH G). FOR CURRENT DAILY SMOKERS (B1=1), THE QUESTION SHOULD ASK ABOUT DAILY USE (NUMBER PER DAY). FOR CURRENT LESS THAN DAILY SMOKERS (B1=2), THE QUESTION SHOULD ASK ABOUT WEEKLY USE (NUMBER PER WEEK).

IF RESPONDENT REPORTS SMOKING THE PRODUCT BUT NOT EVERY (DAY/WEEK), ENTER 888

READ EACH ITEM:

INT: VERIFY THIS IS # OF CIGARETTES, NOT PACKS

[ADJUST CATEGORIES FOR SPECIFIC COUNTRY]

LESS THAN 1 PER DAY BUT MORE THAN 0 ▼

a. Manufactured cigarettes? ..... ☐☐☐ PER DAY/WEEK… ..... ☐ 888

b. Hand-rolled cigarettes?				PER DAY/WEEK ..... …	☐ 888
c. Pipes?				PER DAY/WEEK	☐ 888
d. Cigars, cheroots, or cigarillos?				PER DAY/WEEK	☐ 888
e. Clove Cigarettes? ….				PER DAY/WEEK	☐ 888
f. Water pipes called hookah or chillum?				PER DAY/WEEK	☐ 888
g. Any others?..... → Specify type:_____				PER DAY/WEEK	☐ 888

INTERVIEWER: IF B1 = 1, ASK B5. OTHERWISE SKIP TO C1.

B5. How soon after you wake up do you usually have your first smoke? Would you say within 5 minutes, 6 to 30 minutes, 31 to 60 minutes, or more than 60 minutes?

WITHIN 5 MINUTES……☐ 1 → SKIP TO C1

6 TO 30 MINUTES……☐ 2 → SKIP TO C1

31 TO 60 MINUTES……☐ 3 → SKIP TO C1

MORE THAN 60 MINUTES……☐ 4 → SKIP TO C1

FORMER SMOKERS: Cessation

B6. How long has it been since you stopped smoking?

INTERVIEWER: ONLY INTERESTED IN WHEN RESPONDENT STOPPED SMOKING REGULARLY -- DO NOT INCLUDE RARE INSTANCES OF SMOKING

ENTER UNIT AND NUMBER

YEARS……. ☐ | | |

MONTHS…….. ☐ 2 | | |

WEEKS…….. ☐ 3 | | |

DAYS…….. ☐ 4 | | |

LESS THAN ONE DAY (24 HOURS)……. ☐ 5

DON'T KNOW…….. ☐ 7

B7. What are the main reasons you stopped smoking? [Select all that apply]

Felt sick ..... ☐ 1

To improve my health ..... ☐ 2

To save money ..... ☐ 3

Influence from family/ friends ☐ 4

Other..... ☐ 5

B8. When you quit smoking, did you receive assistance from a doctor or other healthcare provider?

Yes ..... ☐ 1

No..... ☐ 2

I did not visit a doctor's office before quitting ☐ 3

B9. When you quit smoking, did you contact a "quitline", a free phone number for smokers to call to get help?

Yes ..... ☐ 1

No..... ☐ 2

I have never heard of a quitline ☐ 3

C. SMOKELESS TOBACCO USE

C1. Do you currently use smokeless tobacco - such as nissar, naas, pan ?

Yes……..…☐ 1

No……☐2

[DON'T KNOW]……..☐ 7

D. Quit Attempts

Checklist: INTERVIEWER: CHECK THE ANSWER TO B1 AND RECORD BELOW:

B1 = ___

IF B1 = 1 or 2 (RESPONDENT CURRENTLY SMOKES TOBACCO), THEN CONTINUE WITH

D1.....1

IF B1 = 3 or 7 (RESPONDENT DOES NOT CURRENTLY SMOKE TOBACCO), THEN SKIP TO

E1.....2

D1. During the past 12 months, have you tried to stop smoking?

YES……☐ 1

NO……☐ 2 SKIP TO D4

D2. What is(are) the main reason(s) you decided to try to quit smoking in the past 12m ? [Select all that apply]

Felt sick ..... ☐ 1

To improve my health ..... ☐ 2

To save money ..... ☐ 3

Influence family/friends ☐ 4

Other..... ☐5

D3. When you tried to quit smoking in the past 12months, did you contact a "quitline", a free phone number for smokers to call to get help?

Yes ..... ☐ 1

No..... ☐ 2

I have never heard of a quitline ☐ 3

D4. During any visit to a doctor or health care provider in the past 12 months, were you advised to quit smoking tobacco?

YES……☐ 1

NO……☐ 2

D5. Which of the following best describes your thinking about quitting smoking? I am planning to quit within the next month, I am thinking about quitting within the next 12 months, I will quit someday but not within the next 12 months, or I am not interested in quitting?

QUIT WITHIN THE NEXT MONTH…… ☐1

THINKING WITHIN THE NEXT 12 MONTHS……☐2

QUIT SOMEDAY, BUT NOT NEXT 12 MONTHS……..☐3

NOT INTERESTED IN QUITTING……..☐4

DON'T KNOW……..☐7

E. SECONDHAND SMOKE

E1. How often does anyone smoke inside your home? Would you say daily, weekly, monthly, less than monthly, or never?

DAILY……☐ 1

WEEKLY……..☐ 2

MONTHLY……☐ 3

LESS THAN MONTHLY……..☐ 4

NEVER……..☐ 5

[DON'T KNOW]……..☐ 7

E2. How often does anyone smoke around you in public places, such as a restaurant, movie theater, or where you work? Would you say daily, weekly, monthly, less than monthly, or never?

DAILY……☐ 1

WEEKLY……..☐ 2

MONTHLY……☐ 3

LESS THAN MONTHLY……..☐ 4

NEVER……..☐ 5

[DON'T KNOW]……..☐ 7

F. MEDIA

INTERVIEWER: IF B1 = 1 OR 2 (CURRENT SMOKER), ASK F1. OTHERWISE SKIP TO Section G.

F1. In the last 30 days, did you notice any pictures of health warnings on cigarette packages?

YES……☐ 1

NO……☐ 2 → SKIP TO SECTION G

DID NOT SEE ANY CIGARETTE PACKAGES……☐ 3 → SKIP TO SECTION G

F2. In the last 30 days, have pictures of warning labels on cigarette packages led you to think about quitting?

YES……☐ 1

NO……☐ 2

DON'T KNOW……☐ 7

G. ECONOMICS

INTERVIEWER: CHECK THE ANSWERS TO B1, B4a. RECORD BELOW:

B1 = ___

B4a = ___

IF B1 = 1 OR 2 (RESPONDENT CURRENTLY SMOKES DAILY OR LESS THAN DAILY)

AND

B4A = 1-888 (RESPONDENT SMOKES MANUFACTURED CIGARETTES)

THEN ASK G1

OTHERWISE, SKIP TO H1

G1. The last time you bought cigarettes for yourself, how many cigarettes did you buy?

INTERVIEWER: RECORD NUMBER AND CHECK UNIT

☐☐☐

CIGARETTES……...☐ 1

PACKS……..☐ 2→ How many cigarettes in each pack? ☐☐

CARTONS……..☐ 3→ How many cigarettes in each carton? ☐☐☐

OTHER SPECIFY:_____☐ 4→ How many cigarettes in each [FILL]? ☐☐☐

NEVER BOUGHT CIGARETTES……..☐ 5 → SKIP TO H1

G2. In total, how much money did you pay for this purchase?

INTERVIEWER: IF DON'T KNOW, ENTER 777

☐☐☐ Pakistan Rupee

H. KNOWLEDGE, ATTITUDES, PERCEPTIONS

INTERVIEWER: CHECK THE ANSWERS TO B1 RECORD BELOW:

B1 = ___

IF B1 = 1 OR 2 (RESPONDENT CURRENTLY SMOKES DAILY OR LESS THAN DAILY)

THEN ASK H1

OTHERWISE, SKIP TO I1

H1. Now that you have developed TB, how important do you think it is to stop smoking on a scale of 1 to 5 where 1 is "not important" and 5 is "very important"?

Not important..... ……☐ 1

Somewhat important ……☐ 2

[Neutral]..... ……☐ 3

Important..... ……☐ 4

Very important..... ……☐ 5

H2. Based on what you know or believe does quitting smoking prevent your chances of developing new TB infections in the future?

Yes……..…☐ 1

No……☐2

[DON'T KNOW]……..☐ 7

I. ALCOHOL USE

I1. How often did you drink alcohol before your most recent diagnosis of TB?

NEVER…… ☐ 1 → SKIP TO J1

LESS THAN ONCE PER WEEK……. ☐ 2

1-2 DAYS PER WEEK……. ☐ 3

3-4 DAYS PER WEEK …….☐ 4

5-6 DAYS PER WEEK……. ☐ 5

EVERYDAY……. ☐ 6

I2. On days that you drank, how many drinks did you typically have?

INTERVIEWER: IF DON'T KNOW, ENTER "77"

☐☐ # of drinks 1 drink = 350 ml bottle or can of beer (a large bottle of beer is a quart=2 drinks) A glass of wine is 1 drink , one tot of hard liquor is 1 drink.

J. Current Health

J1. Have you been diagnosed with HIV?

YES.....☐1
NO.....☐2
DON'T KNOW.....☐7

J2. How many times have you been treated for TB in your life?

☐☐ If don't know, Enter "77"

J3. Were you coughing when you were most recently diagnosed with TB?

Yes……☐1

No…….☐2→ SKIP TO J5

J4. Did you cough up sputum?

Yes……. ☐ 1

No……. ☐ 2

INTERVIEWER: CHECK THE ANSWERS TO B1 & B2 RECORD BELOW:

B1 = ___

B2 = ___

IF B1 = 3 and B2 = 3 (RESPONDENT IS A NEVER SMOKER) then skip to SECTION K.

OTHERWISE, Continue with J5.

J5. When your symptoms began to develop for your most recent TB diagnosis did the amount of tobacco that you smoked (please identify the most appropriate answer)

Increase…… … ☐ 1

Decrease …… …… . ☐ 2

Stay the same …… … … ☐ 3

I quit smoking when my symptoms developed…… … . ☐ 4

I was not smoking when my symptoms developed…… …. ☐ 5

J6. When your doctor most recently told you that you had TB, did the amount of tobacco that you smoked (please identify the most appropriate answer)

Increase…… … ☐ 1

Decrease …… …… . ☐ 2

Stay the same …… … … ☐ 3

I quit smoking after my doctor told me that I had TB …… ☐ 4

I had stopped smoking before my doctor told me that I had TB ☐ 5

I very recently learned of my TB diagnosis and haven't had

the chance to change my smoking habits……..……..…..… ☐ 6

I stopped smoking because I have been hospitalized and

cannot smoke……☐ 7

Confirmation of TB diagnosis from medical record

Date of most recent TB diagnosis : (MM/DD/YY): __ __/__ __/__ __

Method of Diagnosis :

	Date	Result
Sputum Smear		
Culture		

Patient Category:

New
ReTreatment

END INDIVIDUAL QUESTIONNAIRE

Those are all of the questions I have. Thank you very much for partcipating in this important survey.

TIME INTERVIEW ENDED [24 HOUR CLOCK]	___ ___ : ___ ___ HRS MINS

RECORD ANY NOTES ABOUT INTERVIEW:

STUDY 2: HEALTH CARE PROVIDER SURVEY

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH

Study title: Feasibility of integrating tobacco cessation activities in tuberculosis DOTS treatment programs in Pakistan

This research survey is being conducted by Ayesha Khan from the Johns Hopkins University Bloomberg School of Public Health. We are conducting a research study about tobacco use and cessation. The overall objective of this study is to explore barriers to and opportunities for smoking cessation for tuberculosis (TB) patients who are smokers attending Direct Observed Therapy (DOTS) treatment programs in Pakistan. The health provider survey examines health care provider attitudes, knowledge and beliefs on tobacco use and cessation interventions.

The following survey should take about ten minutes to complete. Your responses are anonymous; you should not include any identifying information on this survey. We ask that you try to answer all questions. However, if there are any questions that you would prefer to skip, simply leave the answer blank. You must be at least 18 years old to participate.

Completion of the survey implies that you have consented to participate in the study. If you would prefer not to participate, simply return the blank survey. Completed surveys should be returned in the attached envelope to the drop box provided.

Researcher contact information:

Name: Ayesha Khan
Title: DrPH Candidate
Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Phone: 03005558097
Email: akhan0103@gmail.com

This research has been reviewed by the Institutional Review Board for the Protection of Human Subjects (IRB).

Please keep this sheet for your reference.

Health Care Provider Survey

	Section 1
1.	What is your gender? (circle one) 1. Male 2. Female
2.	What is your age? _____ years
3.	Which of the following best describes your smoking behaviour? (Please circle your answer) a. I have never smoked cigarettes b. I have quit smoking c. I currently smoke occasionally (Some days) (Go To Question 3a) d. I currently smoke every day (Go To Question 3a)
3a. 3b.	If you currently smoke: What are the reasons for using tobacco? (Please circle your answer) a. Stress/Anxiety b. Habit/Addiction c. Work Pressure d. Enjoyment e. Other_____ Which of the following best describes how you feel about your smoking? a. Not ready to quit within the next 6 months b. Thinking about quitting within 6 months c. Ready to quit now
	Section 2
4.	What is your primary professional occupation? (Circle one) a. Physician b. Nurse (RN) c. Nursing Assistant d. Health Worker e. Clinical Technician f. Registrar g. Other:_____

5.	What is your primary field of specialty? _____
6.	How many years have you been in practice? _____years
7.	Where is your workplace/practice located? Urban Rural Suburban
8.	How many patients do you tend to provide care for on a typical day in the clinic or field? (Circle one) None Less than 10 10-20 20-40 More than 40
9.	How many TB patients do you tend to provide care for on a typical day in the clinic or field? (Circle one) None Less than 10 10-20 20-40 More than 40
10.	On average, how much time do you spend with each TB patient? (Circle one) 5 minutes 10 minutes 15 minutes 20 minutes 30 minutes 60 minutes
11.	What percent of your patients do you think smoke? _____
12.	What percent of your co-workers smoke? _____
	Section 3. Please rate the following by circling the appropriate number
13.	Smoking is harmful to your health. Strongly Agree 1 2 3 4 5 Strongly Disagree
14.	It is the responsibility of health professionals to routinely ask about their patients smoking habits Strongly Agree 1 2 3 4 5 Strongly Disagree
15.	I am knowledgeable about the 5A's smoking cessation method (ask, advise, assess, assist, and arrange) Strongly Agree 1 2 3 4 5 Strongly Disagree

16.	People who smoke are more likely to develop tuberculosis or experience a recurrence than non-smokers.						
	Strongly Agree	1	2	3	4	5	Strongly Disagree
17.	How interested are your TB patients in quitting smoking?						
	Not Interested	1	2	3	4	5	Very Interested
18.	How successful do you think your TB patients would be if they tried to quit smoking?						
	Not Successful	1	2	3	4	5	Very Successful
19.	How important is smoking cessation counseling as part of a TB program?						
	Not Important	1	2	3	4	5	Very Important
20.	I feel that I am able to help my patients quit smoking.						
	Strongly Agree	1	2	3	4	5	Strongly Disagree
21.	About how often do you ask your patients whether they smoke cigarettes?						
	Never	1	2	3	4	5	Always
22.	There is enough time during a consultation with a TB patient to discuss smoking behavior and cessation.						
	Strongly Agree	1	2	3	4	5	Strongly Disagree
23.	Patients' chances of quitting smoking are increased if their doctor advises him or her to quit.						
	Strongly Agree	1	2	3	4	5	Strongly Disagree

24.	How effective do you think the following methods are in helping TB patients who smoke to quit?							
	Counseling by a Physician	Not at all effective	1	2	3	4	5	Very Effective
	Group Counseling	Not at all effective	1	2	3	4	5	Very Effective
	Smoking Quitline	Not at all effective	1	2	3	4	5	Very Effective
	Medication (nicotine patch, nicotine gum)	Not at all effective	1	2	3	4	5	Very Effective
25.	**Please rank the following: 1 – 5 with 1= most time, 5 = least time** How much time do you spend on each of the following topics when you are with your TB patients? Place a "1" next to the activity that you spend the most time on, a "2" next to the activity that you spend the next most time on, and so on. Remember, no two activities can have the same ranking. _____ HIV _____ Nutrition _____ Tobacco use _____ Alcohol Use _____ Family Planning _____ Other							
26.	Which would most encourage you to discuss smoking cessation with your patients? Place a "1" next to what most encourages you, a "2" next to what next most encourages you, and so on from 1-5, with 5 being the least important. Remember, no two can have the same ranking. _____ Reimbursement for Time _____ Lower Patient Loads _____ Free Nicotine Replacement Therapy _____ Mandate from NTB program _____ Options for referal							

STUDY 3: PROVIDER FOCUS GROUP FACILITATOR GUIDE

START TIME: _____ END TIME: _____

DATE CONDUCTED: _____

NAME OF MODERATOR: _____

NUMBER OF PARTICIPANTS: _____

BRIEF DESCRIPTION OF PARTICIPANTS:

1. Participant 1: _____
   _____
2. Participant 2: _____
   _____
3. Participant 3: _____
   _____
4. Participant 4: _____
   _____
5. Participant 5: _____
   _____
6. Participant 6: _____
   _____
7. Participant 7: _____
   _____
8. Participant 8: _____
   _____
9. Participant 9: _____
   _____
10. Participant: 10: _____
    _____

GROUND RULES, CONFIDENTIALITY, AND HOUSEKEEPING

Welcome:

Thank you for attending today's informal group discussion. We appreciate your time and effort to be with us. My name is { } and I am with _____. I will be the moderator for today's focus group discussion.

Focus group goal:

We are interested in hearing from you about smoking. Specifically, we're interested in hearing about any prior experience you may have had trying to quit smoking. We will use the things you tell us today to design a program to help people quit smoking.

Confidentiality:

- *As explained in the consent form, today's conversation will be taped, but nothing that you say will be linked to your name. The tapes will be reviewed and a written report will be prepared that summarizes our conversation today. Only research staff working on this project will hear your comments - the tapes will never be played for the public. Also, the written report will not have anyone's name on it. If we do quote you, we would refer to you by your sex and age, such as "a man aged 40 years old." Today, we will call everyone by their chosen "nicknames" listed on their name tags. Even though some of you might know each other by a different name, we ask that everyone please use these nicknames to help keep everyone's identity secret on the audio tape.*

- *Because we do our best to protect your privacy, I ask everyone in this group to not share the information we discuss here with people outside the group.*

- *The topics discussed today may address some sensitive issues. If there are issues that you prefer to keep private, please do so. Our goal is for everyone to feel comfortable so that we can have a good discussion and really understand your experiences. Also, if at any point in the discussion, you feel that you would like to discontinue participation, please do not hesitate to let me know.*

Ground rules:

Before we begin, there are some requests I would like to make.

- *There are no right or wrong answers to any of the questions we are asking. We are interested in your experiences and opinions – they really matter to us!*
- *It would be helpful if we can listen to everyone's comments. If you disagree with what someone else has said, please share your comments in a polite manner. Whether you agree or disagree, we would like to hear about it. Every response is welcomed.*
- *Please say exactly what you think -- positive or negative comments are welcomed.*

- *Since this will be taped recorded, we ask that you speak loud enough so all can hear and speak one at a time.*

Housekeeping:

- *The focus group will last about 60 minutes. We will take a break halfway through the group discussion.*
- *The bathrooms are located….*

Questions:

- *Are there any questions? [Address all questions.] Ok, let's get started.*

1. INTRODUCTION.....5 MINUTES

I'd like to start by getting to know a little bit about each of you. Please tell us your first name and where you're from. I will start, my name is …., and I'm from…

2. TOBACCO USE AND PATIENTS.....15 MINUTES

To start off, I would like to ask how many of you smoke. How many of your colleagues smoke, in your opinion? If at any time talking about anything in this session makes you uncomfortable, feel free to say so or not answer. Your experiences with patients cigarette smoking helps us to understand how we can help TB patients who use tobacco, but we don't want to do so if it makes you uncomfortable.

A. How many of your patients do you think smoke? How much smoking occurs in patient homes?
    a. Which patients tend to smoke or use tobacco products? [Prompts: Younger patients, older patients, patients who have money]
    b. What are some reasons that TB patients smoke? [Prompts: Pleasure, social activity, addiction]

B. Smoking can cause serious diseases like lung cancer and heart disease, what do you think of the role of smoking on TB?
    a. Does other peoples smoking at home or at works affect TB patients?

C. How often do you ask patients about smoking and their health? When?
    a. Do patients ever ask you about their smoking, and can you think when they talk about smoking – when they are most sick, as they get better?
        i. Do patients ask how they can quit? Where to go for help in quitting?

3. ROLE OF HEALTH PROFESSIONAL.....15 MINUTES

Now I would like us discuss the role of a TB health care provider in tobacco use control. Your experiences related to cigarette smoking helps us to understand how we can help TB patients who use tobacco, but we don't want to do so if it makes you uncomfortable.

A. What is a health care worker/physician responsibility for changing patient behaviors?
    a. Do you think your behavior impacts on what patients choose to do and think?

B. Do you think helping patients stop smoking is a part of treating patients for TB disease?

C. What information should TB patients get/expect from the health workers they interact with? [Prompt: nutrition, dangers of smoking, alcohol use]

D. Do you think your patients are interested in stopping smoking? Why?
    a. Will patients try to quit smoking if their doctor tells them it is bad for their health/TB?

BREAK:

4. SMOKING CESSATION .....30 MINUTES

If you have quit smoking, or don't smoke, think about what helped you to quit smoking, or why you don't smoke.

A. Has anyone here ever tried to quit?
    a. How did that go?
    b. [If former smoker, ask:] Could you tell us how you quit smoking?

B. Would you be willing to include smoking cessation advice in the time spent with your patients? Why?
    a. How long do you think it would take to talk about smoking cessation to a TB patient?
    b. Can patients understand the harmful effects of smoking on their health? On their families health?

    c. Will cessation advice help patients change their smoking behaviors?

C. Do you think you would do a good job helping patients stop smoking? What skills do you have that would help you?
    a. Do you know about the 5As for smoking cessation? Do you use them in your clinic?
        i. What other methods do you know about that work for quitting smoking?
    b. Which method would be most effective for TB patients in this area? Why?

D. What could your work place do that would help you provide smoking cessation advice to patients?

    a. Is there enough time? Education/training?
    b. Additional staff- cessation counselor?
    c. Free medication for patients?

.....5 MINUTES

Those are all the questions we have for you today. Do you have any questions that we can answer? We really appreciate your participation and your willingness to talk about your experience and opinions. The information that you have shared with us this evening will be very helpful to us in developing quit smoking programs that are appealing to other smokers like yourselves. On behalf of _____, we would like to thank you for your participation in this conversation.

STUDY 3: PATIENT FOCUS GROUP FACILITATOR GUIDE

1. INTRODUCTION.....5 MINUTES

I'd like to start by getting to know a little bit about each of you. Please tell us your first name and where you're from. I will start, my name is …., and I'm from…

2. TOBACCO USE.....20 MINUTES

To start off, I would like us to discuss smoking in general, about if you smoke or know people who smoke. If you have quit smoking, or don't smoke, think about when you were a smoker or people who you know that do smoke and answer in terms of that time or person. If at any time talking about certain behaviors makes you uncomfortable, feel free to say so or not answer. Your experiences related to cigarette smoking helps us to understand how we can help TB patients who use tobacco, but we don't want to do so if it makes you uncomfortable.

D. How many of you currently smoke cigarettes (or bidis, chillum) or use paan, gutka?

   a. How often do you smoke? [Prompts: Every day, a few times a week, at social events?]
   b. In general, when do you smoke the most?
   c. What makes you want to smoke?
      [Prompts:] In the morning, when you first wake up? While you're drinking tea? A mid-morning or mid-afternoon break? Does anyone smoke right before bed? Are there common triggers to smoking (work, family, friends' illness, etc)]

E. Does it seem as if many people smoke where you live/work?

   a. Does any of your family or people who live with you smoke cigarettes/bidis, etc? Are many of your friends, people who visit you regularly smokers?
   b. When you are at work, or outside catching a bus, doing shopping or going out to eat or see a movie- do many people smoke near you? Where?
   c. Do you think more people are smoking cigarettes now than before? Why do you think that is?

F. Smokers, do you ever change how much you smoke sometimes? Why?

   a. Have you seen pictures of people who got sick from smoking on cigarette packs – did it make you think smoking was bad for you? That you should stop smoking?
   b. There are smoking laws in Pakistan; do you know what they are? Do they stop you from smoking in certain places, like the hospital?

   c. Why do you think a doctor tells you to stop smoking?

3. SMOKING AND TB/HEALTH.....20 MINUTES

Now I would like us discuss TB, smoking and health. Your experiences related to cigarette smoking helps us to understand how we can help TB patients who use tobacco, but we don't want to do so if it makes you uncomfortable.

E. How did you get sick with TB?
   a. What can make you more likely to become sick with TB?
   b. Do you think that once you have TB, do you always have it or does it get cured with medicine?

F. What should your doctor tell you about TB?

G. Do you think smoking do anything to your health? How does smoking affect your health or your family's health?

H. Before you were diagnosed with TB and you smoked or were around smokers, how did it make you feel?
   a. And, when you started to feel sick?

I. What should your doctor tell you about smoking?

BREAK:

4. SMOKING CESSATION.....20 MINUTES

E. Has anyone here ever tried to quit?
   a. How did that go?
   b. [If former smoker, ask:] Could you tell us how you quit smoking?

F. For those of you who are interested in quitting smoking, how have you thought about doing it?
   a. Do you know about any methods that people use to quit smoking?
   b. Do you know any places in the city that you could go to get help in quitting smoking?

G. What do you think would be the most helpful way to stop smoking?
   a. Can doctors help you stop smoking? Or medication?
   b. What would you think about having a counselor to help you quit smoking?
   c. What would you think about going to group meetings to help you quit smoking?
      i. Which would you prefer, individual or group, and why?

.....5 MINUTES

Those are all the questions we have for you today. Do you have any questions that we can answer? We really appreciate your participation and your willingness to talk about your experience and opinions. The information that you have shared with us this evening will be very helpful to us in developing quit smoking programs that are appealing to other smokers like yourselves. On behalf of _____, we would like to thank you for your participation in this conversation.

Ayesha Khan

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Baltimore, Maryland 21218
410-366-1990
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EDUCATION

Johns Hopkins Anticipated
Bloomberg School of Public Health
Doctor of Public Health

Johns Hopkins 2007
Bloomberg School of Public Health
Master of Public Health

The Johns Hopkins University 2002
Zanvyl Kreiger School of Arts and Sciences
Master of Science, Developmental Psychology

University of Maryland, **College Park** 1991
Bachelor of Science, Psychology

PROFESSIONAL EXPERIENCE

Johns Hopkins Bloomberg School of Public Health July 1998- Present
Department of Epidemiology
Coordinator, Graduate Summer Institute of Epidemiology and Biostatistics

- Provide overall management and direction for Graduate Summer Institute of Epidemiology and Biostatistics, a summer academic program that enrolls 500+ students annually. Responsible for all administrative functions of the Institute including but not limited to Summer Institute administration, academic coordination, human resources, financial management, facilities management, information technology, formulation and implementation of administrative policies and procedures necessary for efficient and effective operation of the educational activities of the Institute. Provide overall management and supervision of the administrative staff. Coordinate and manage all administrative functions including staffing, special Summer Institute projects and reports, special events, conferences, seminars, and fiscal issues.

- Coordinate and administer core courses of the Department of Epidemiology during the academic year. Assist with development of course content and exams, organize faculty and teaching assistant schedules, course schedules, course registration, textbook orders, course evaluations, syllabi construction, and student information. Work with both faculty and department chair to ensure appropriate faculty are assigned for all courses; current syllabi are available for courses; monitor and evaluate course enrolments; ensure all courses are appropriately scheduled. Hire and organize teaching assistants per course. Responsible for planning and managing logistical arrangements, audiovisual needs, preparing and disseminating course materials.

Johns Hopkins University School of Medicine October 1992 - July 1998
Department of Infectious Disease, AIDS Clinical Trials Group
Research Coordinator

- Organized and managed materials and procedures necessary for daily function of research studies. Responsible for reviewing new protocols and developing lab schedules and test requisitions for each clinic visit; quality assurance on protocol notebooks and clinic notes; preparation of participant charts/protocol notebook/lab requisitions for each clinic visit; schedule

patient appointments; patient randomization, electronic identification and document retrieval; assist with data entry; identify and resolve data issues with clinicians; resolve data errors with data manager; assist with annual report on patient demographics.

Johns Hopkins Bloomberg School of Public Health April - July 1992
Department of Epidemiology
Graduate Summer Program in Epidemiology
Administrative Assistant

- Managed database system for maintaining student information; generated letters of acceptance, billing; advised prospective applicants on courses, lodging, fees; handled contract billing of government agencies; assisted with program registration and event planning; obtained information material from various University departments; prepared student information packets; served as liaison with University health services, conference services, external vendors and Baltimore city organizations

First English Lutheran Nursery Program 1989 – 1991
Teaching Assistant

- Assisted primary teacher, in daily learning and play activities; planned weekly schedule ; involved with parent-teacher conferences

Professional Services Incorporated, Baltimore, Maryland 1987
Lab Technician

- Tested building material samples for asbestos fibers.

COMPUTER SKILLS

MS Excel, MS Access, MS Word, Word Perfect, Power Point, SPSS, Stata

OTHER
Excellent verbal and written communication skills
Supervisory Experience – Supervisor for administrative assistants of Office of Academic Support Core, Department of Epidemiology